

December 1960

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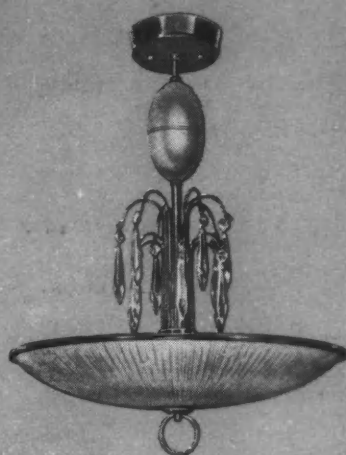
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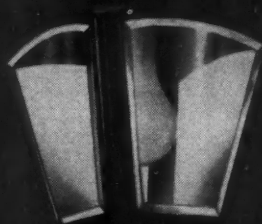


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Vol. 76

December 1960

No. 12

Lighting for Smithsonian exhibitions —	10
Mystery of Orient captured in lighting —	12
Model home raises lighting criteria —	14
Guestroom of tomorrow displays new lighting —	17
Directional lighting for a traditional church —	20
How lighting lifts production —	22
Photocells for lighting applications —	24
Safe lighting for a Go Kart track —	26
Getting a start in fixture wholesaling —	28
Economic trends in 1961 —	32

Departments

Editorial comment —	4
News briefs —	6
Lighting sales ideas —	36
Lighting installation —	40
Lighting Code rules —	42
Lighting data sheet —	44
Information coupon —	45
Lighting industry news —	46
New lighting products —	51
Bulletins and catalogs —	57

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Lighting is published monthly by W. R. C. Smith Publishing Company at 34 N. Crystal St., East Stroudsburg, Pa., with editorial and executive offices at 806 Peachtree St., NE, Atlanta 8, Ga. Yearly subscription, \$4.00; foreign subscription, \$5.00; single copies, 45 cents. Entered August 31, 1932, as second class matter at the Post Office at East Stroudsburg, Pa., under the act of March 3, 1879.

IN THIS ISSUE

Suspending fluorescent fixtures from a 70-foot ceiling posed some difficult problems at the Smithsonian Institution in Washington. **Page 10.**

The new Ports O'Call Restaurant, atop the Southland Center in Dallas, has an enticing atmosphere of the Far East, brought about in part by novel lighting applications and fixtures. **Page 12.**

A "Light for Living Home" in Oklahoma City drew large crowds of visitors every night for two weeks. A TV program from the home highlighted the promotion. **Page 14.**

What may be ahead for hotel-motel guestrooms is summed up in the 1961 "Room of Tomorrow," with lighting as part of the design. **Page 17.**

Among the problems which recently confronted the members of a traditional church in Iowa was the lighting. Today dimmers and spots enable the lighting system to meet various service requirements. **Page 20.**

Cleveland's Hickok Electric Instrument Company has attained a carefully controlled environment featuring a lighting level of 300 footcandles that has boosted output 50 per cent and cut production costs 20 per cent. **Page 22.**

Photocells, which in the last few years have come into their own in the lighting field, provide contractors with an excellent opportunity to "sell up" their jobs. **Page 24.**

Lighting plays an important part in the safety precautions which must be followed in Go Kart racing, an amusement craze presently sweeping the country. In a Savannah installation, lighting amounted to about four per cent of the track cost. **Page 26.**

A contractor who had wasted considerable time in 15 years because of a needed fixture or material decided to solve the problem by opening his own wholesale electrical supply business. **Page 28.**



An industry opportunity

The lighting equipment industry is unique in several respects and this undoubtedly accounts for it having some unusual problems. One feature in which it differs from other industries lies in the fact that some 3,000 manufacturers share its market which amounts to more than a billion dollars annually.

Although some manufacturers bridge over the two principal divisions of the industry—the residential field on the one hand, and the commercial and industrial on the other—the majority are specialists in one field or the other, and thus encounter the special problems of that field alone.

Perhaps the principal problem of the residential lighting equipment manufacturers has been the distribution set-up which has lacked an aggressive sales effort. Electrical contractors have generally been more interested in the installation of fixtures than in aggressive sales promotion, and this difficulty has been compounded by the fact that the principal buyers have been speculative builders rather than homeowners. Very few of the residential fixture manufacturers are large enough to afford consumer type advertising campaigns, but this need is being met to some extent by the activities of the American Home Lighting Institute.

In the commercial and industrial field, the situation has been marked in recent months by a highly competitive sales situation and the need for more intensive industry promotion of the new, higher recommended levels of illumination, as well as the education of lighting consultants to modern lighting techniques.

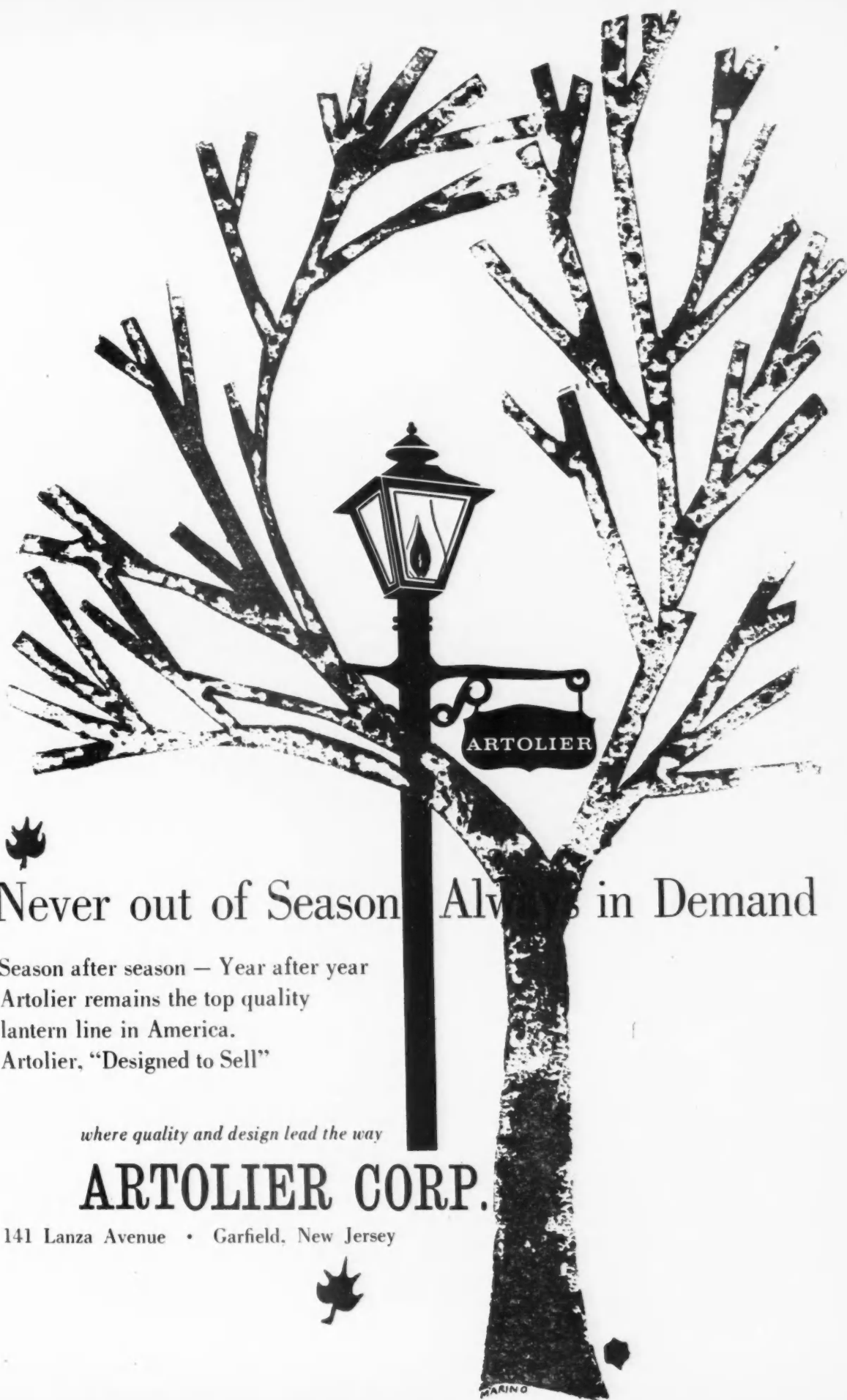
One industry opportunity for the solution of some of its problems is to be found in the National Lighting Exposition and World Lighting Forum to be held in the New York City Coliseum, March 5-8, 1961. This third annual exposition will present over 250 exhibits, many featuring new developments on display for the first time.

The World Lighting Forum will feature nine symposiums, each covering some important aspect of lighting and designed to give practical assistance to those concerned with the design, sale, and installation of lighting. The list of speakers and moderators participating in these symposiums represents a "Who's Who" of the lighting industry.

Of course, the real value to the lighting industry of this exposition and forum lies in the attendance. Certainly last year's results would indicate that the lighting industry has evaluated the need for such an exposition and has given it "acceptance." Registration totaled 16,796 persons, who came from 40 states and 18 foreign countries. Of the industry classifications represented, the largest attendance was registered by electrical wholesalers, contractors, consulting engineers, and architects.

The lighting industry needs this show and forum, and it deserves the full support of the lighting industry.

—Carl W. Evans, Editor



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"I have just reviewed your first issue of LIGHTING and wish to congratulate you on a terrific job. Naturally, this makes me look forward with great interest to your future editions." — **Charles I. Rosen, Executive Vice-President, Artolier Corp.**

"Congratulations on your new book. It is splendidly done." — **Paul Wooten, Chairman, Executive Committee, Society of Business Magazine Editors.**

"I have always admired this publication—very much enjoyed the upgrading your initial issue has provided—and know that as time goes by you will make it a still better publication than ever." — **C. I. Schneider, President, Electro Lighting Corp.**

"Congratulations on your October issue. . . . All indications are that the future of LIGHTING is bright!" — **Richard E. Harz, Supervisor—Marketing Services, Sylvania Lighting Fixture Division.**

"Just a note to tell you that it was like feeling a breath of fresh air to open LIGHTING magazine. . . . The format and content of your first issue bode well for the role this magazine should and can play in our industry." — **John C. Virden, Jr., President, John C. Virden Co.**

"My congratulations on your excellent first issue. I have no doubts that each succeeding edition will be even greater." — **Richard J. Katz, President, Katz, Jacobs & Co., Inc., Advertising.**

"I feel that the publishers, editors, and all concerned are to be congratulated on the appearance and contents of the first issue." — **Byron F. Stevens, Hanson & Stevens, Inc., Advertising.**

"Your October publication LIGHTING arrived yesterday, and I spent most of last evening browsing through it. You have done a very fine job editorially and the articles are well presented." — **B. A. Wilson, President, Cirvac Plastics.**



► The brightest spot on the 1961 economic horizon will be construction, according to the annual outlook statement of the F. W. Dodge Corp. Dodge economists expect that construction contracts will show a slight increase next year, despite an expected mild dip in general business activity. Most of the 1961 strength is expected in contracts for heavy engineering construction, i.e., public works and utilities.

► The slump in home building has been a major factor in home lighting fixture sales every month of 1960. Fixture sales have been lower than the record-smashing totals of 1959, but have held up fairly well in view of the drastic drop in home building. This may indicate more and better fixtures are being sold for homes that are being built, and some advance in selling the important existing home market.

► Rural homes represent a good percentage of the total market for residential lighting fixtures. The nearly 1,000 rural electric co-operatives service electricity to 4,736,000 homes—almost ten per cent of the total of electric-metered dwellings.

► Although housing starts this year are running 19 per cent under 1959 and the demand for used houses is low in many places, outlays for home repairing and remodeling are being made at a record rate. Home owners will spend \$15.1 billion this year for improvements as compared with \$14.3 billion last year and \$11.5 billion in 1958. For every \$3 spent on new homes this year, \$2 will be spent on old ones.

► *New Yorker* magazine recently saluted Abe H. Feder, well known lighting consultant and head of the firm Lighting by Feder, with headquarters at 15 W. 38th St., New York City. Mr. Feder was the subject of the magazine's "Profiles" section in the October 22 issue. The article described his many accomplishments in the field of lighting, discussed his philosophies about lighting, and listed many of the famous building projects that he has lit.

► The trend toward "compacts", so evident in automobiles, will also be a factor in 1961 new home design. Builders feel a more compact, smaller home will sell better in 1961, on the theory that buyers are "buying-scared and don't want to get overcommitted at this time," as one builder put it.

► Apartment construction is headed for a good year. Early indications point to it being 30 per cent ahead of last year. One reason is that young married couples in the low-salary range may not have the credit or cash required for a small down payment and closing costs on a house.

► Construction costs in 11 Southeastern and South Central states plus the District of Columbia rose one per cent between April and October of this year, according to a recent survey.

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Dining Room — The Pete & Gladys Show



Lake Pointe Inn — Detroit, Michigan



Big Boy Restaurant — Port Huron, Michigan

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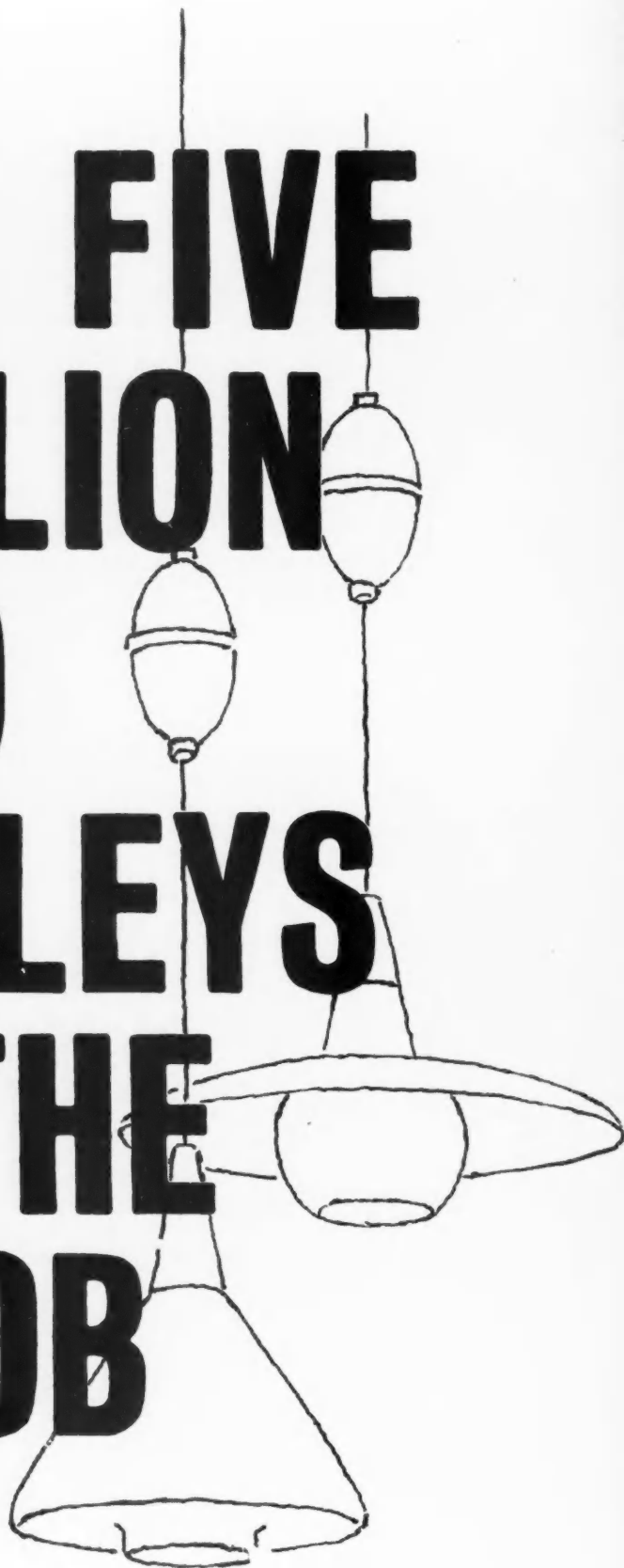
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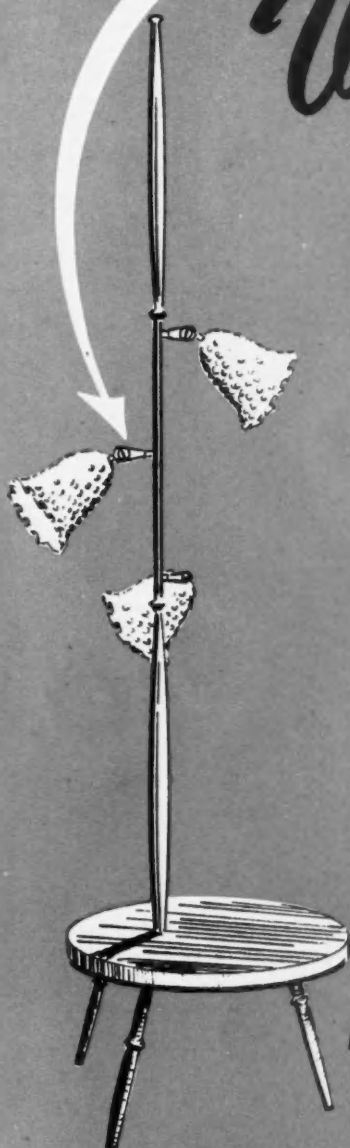
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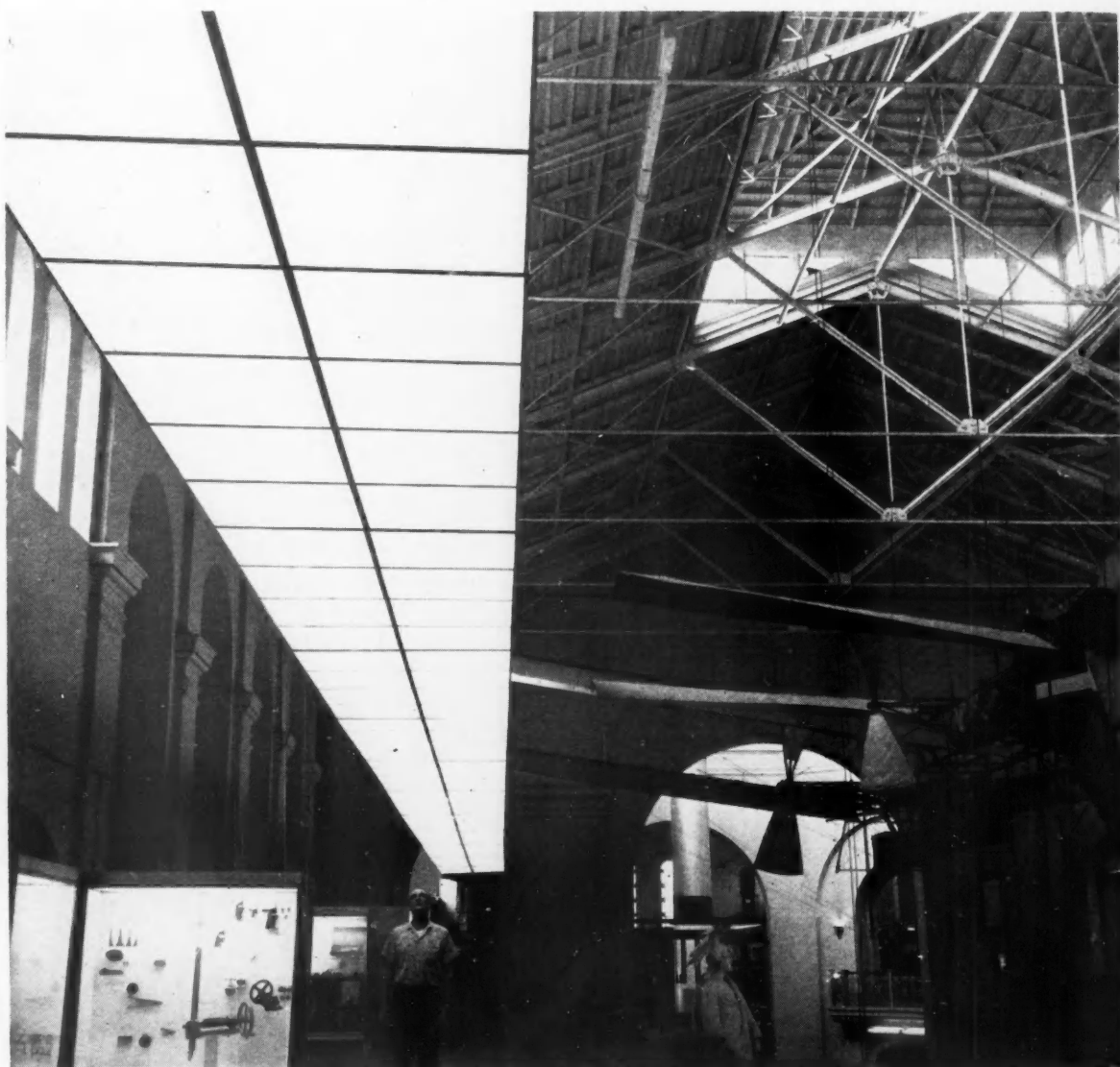


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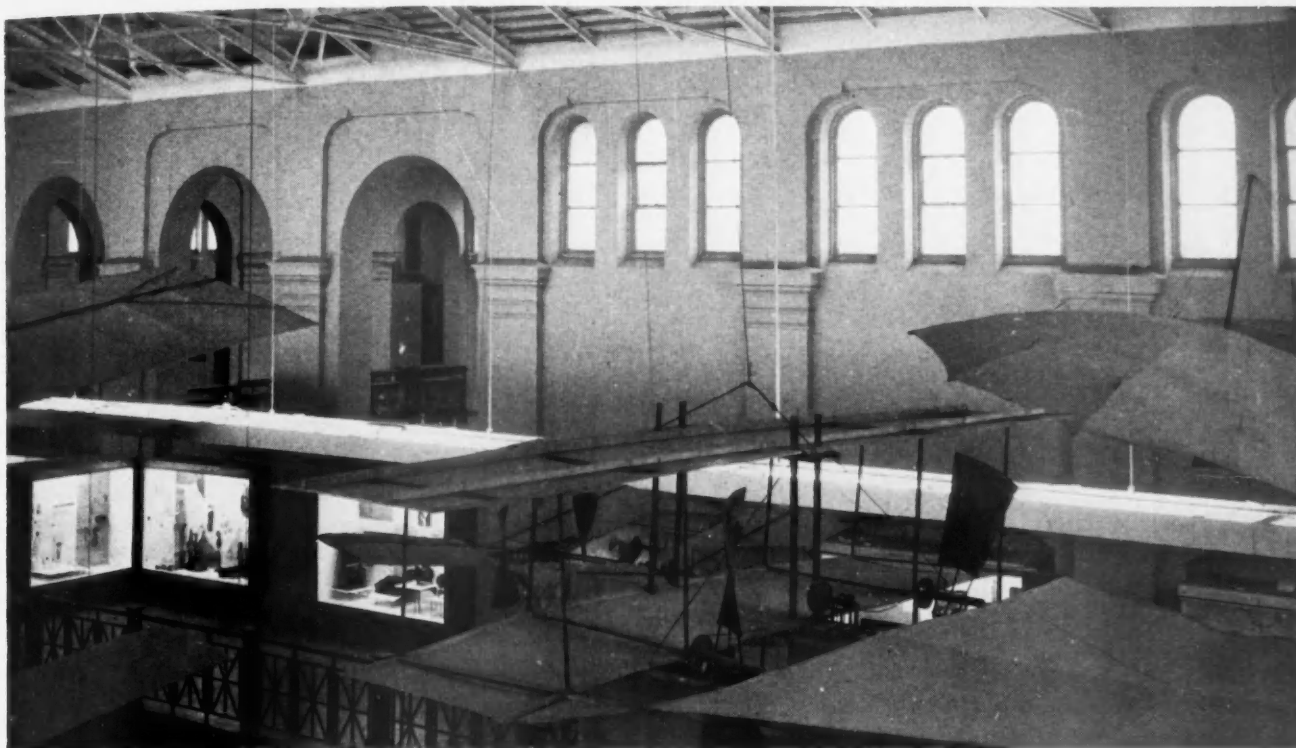


Lighting for Smithsonian exhibitions

Suspending fluorescent fixtures from a 70-foot high ceiling posed some difficult problems for the electric company lighting the display area



Fluorescent, egg-crate type fixtures are extended the entire length of the balcony in the institution. Twelve of the fixtures have been lined up on both sides of this area.



Both the suspended fixtures, hanging from trusses, and lighting effects for encased exhibits can be seen from this viewpoint above the balcony.

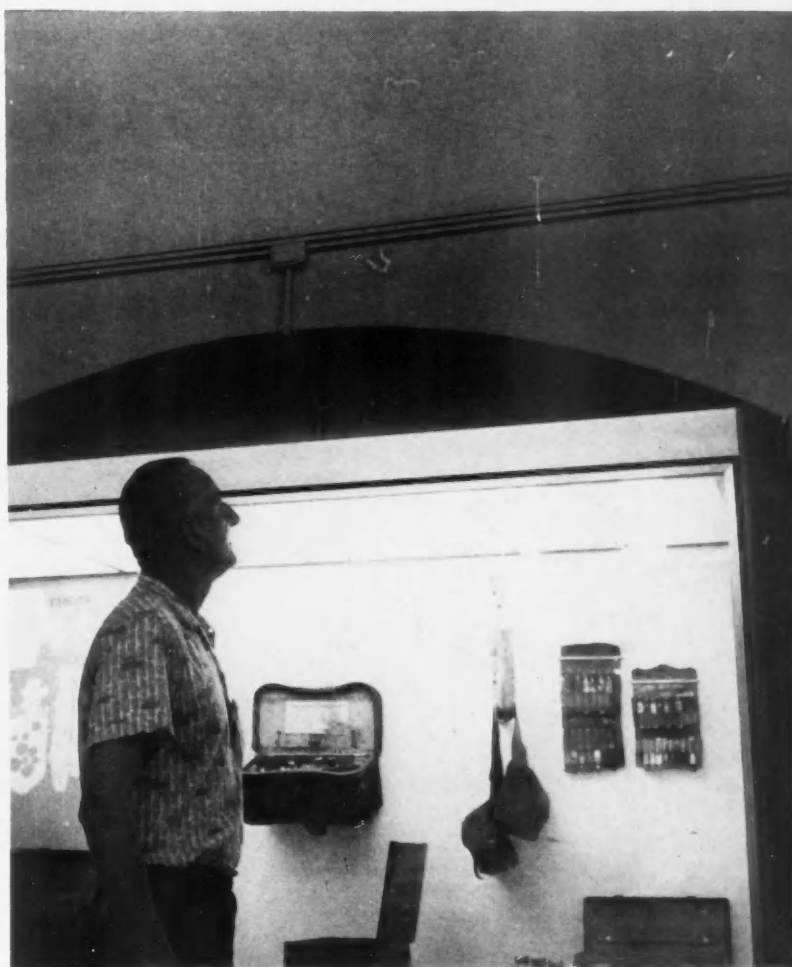
By Walter Trillhaase, Field Superintendent, Trovato Electric Co., Inc., Arlington, Va.

◆ We were engaged to provide better illumination for the exhibit halls of Smithsonian Institution and furnish needed lighting in encased exhibits. Our main problem was suspending fixtures from a 70-foot ceiling. The existing service to the institution was ample.

Working from a balcony around three sides of the building that brought us within 36 feet of the ceiling, we erected scaffolding 30 feet high. Twelve fixtures of the suspended fluorescent egg-crate type were to be lined up on each side of the balcony. In order to hang these weighty fixtures 1 x 4 x 8 feet each, scaffolding had to be secured for the safety of the men. Raising the fixtures to the elevation at which they were to be hung, the mechanics rested the fixtures on the scaffolding, freeing their hands to fasten them at both ends.

We ran 350 feet of three-inch conduit that was installed to carry 500 MCM cable to a new distribution panel feeding the new general lighting and encased exhibits. To get three-inch conduit through walls three feet thick, we found electric

(Continued on page 63)

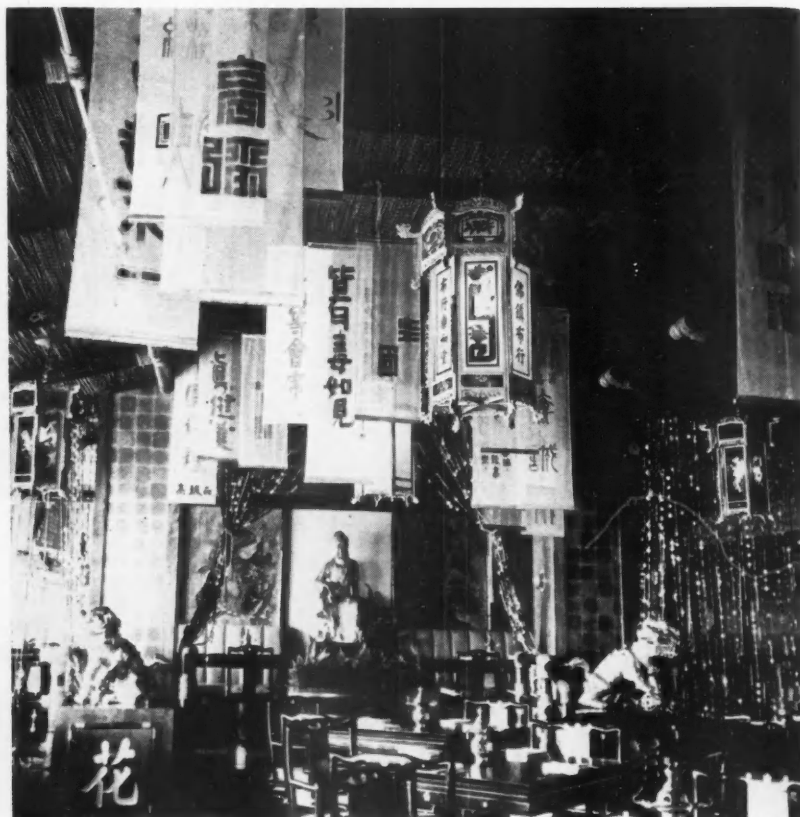


Field Superintendent Walter Trillhaase inspects the neatly installed surface raceway which serves special lighting in the encased exhibits.

**Mystery
of the Orient
captured
by lighting
in Dallas**



Saigon room of Ports O'Call Restaurant, Dallas, Tex., has two oriental type lanterns on columns of temple front; pin-hole spots light idol.



In foreground of the restaurant's Macao room, a six-sided Chinese lantern hangs. This and others in the room contain colored bulbs for warmth.

Ports O'Call Restaurant

**By Bob King, Associate Editor,
Lighting, Dallas, Texas.**

◆ Novel lighting applications and fixtures give the Ports O'Call Restaurant of Dallas, Texas, an enticing atmosphere of the Far East.

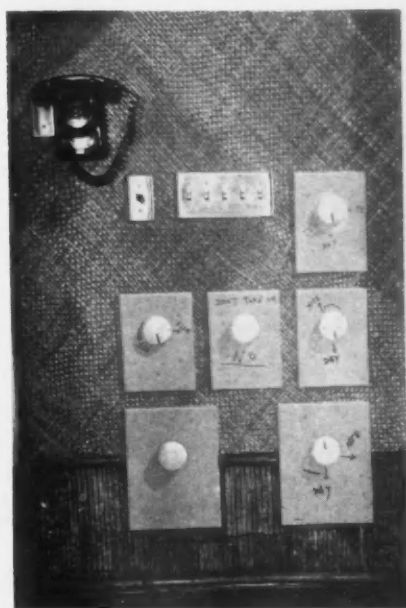
Located on the 37th floor of the Southland Life Building, the unusual restaurant was created and designed by Stephen Crane Associates, Los Angeles, for the Sheraton Dallas Hotel.

As customers to Ports O'Call step from the elevators, attention is drawn to colored flashing lights, and they turn to see a large archway with the gold plated letters "Ports O'Call" across the top.

The flashing lights are from a four-color revolving beacon mounted inside a brass deep sea diver's helmet. Beams from the colored lights flash outward through the large glass faceplate of the helmet.



Also in the Saigon room, a porcelain elephant is highlighted by an overhead spot. Forty 7-watt star bulbs in ceiling add to temple effect.



Each room has a set of manually operated wall type dimmer switches.

uses curio collection for lighting

Colored bulbs glow through translucent blowfish above counter.

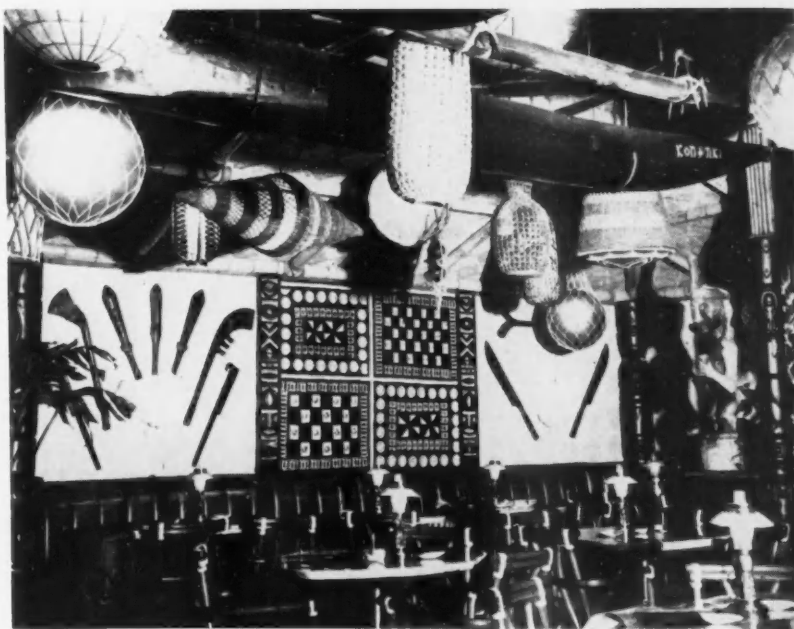


Small accent lights provide illumination on the two steps leading into a hallway. The recessed accent lights are wired to a 12-volt transformer which operates 12 of the small lights throughout the dining areas.

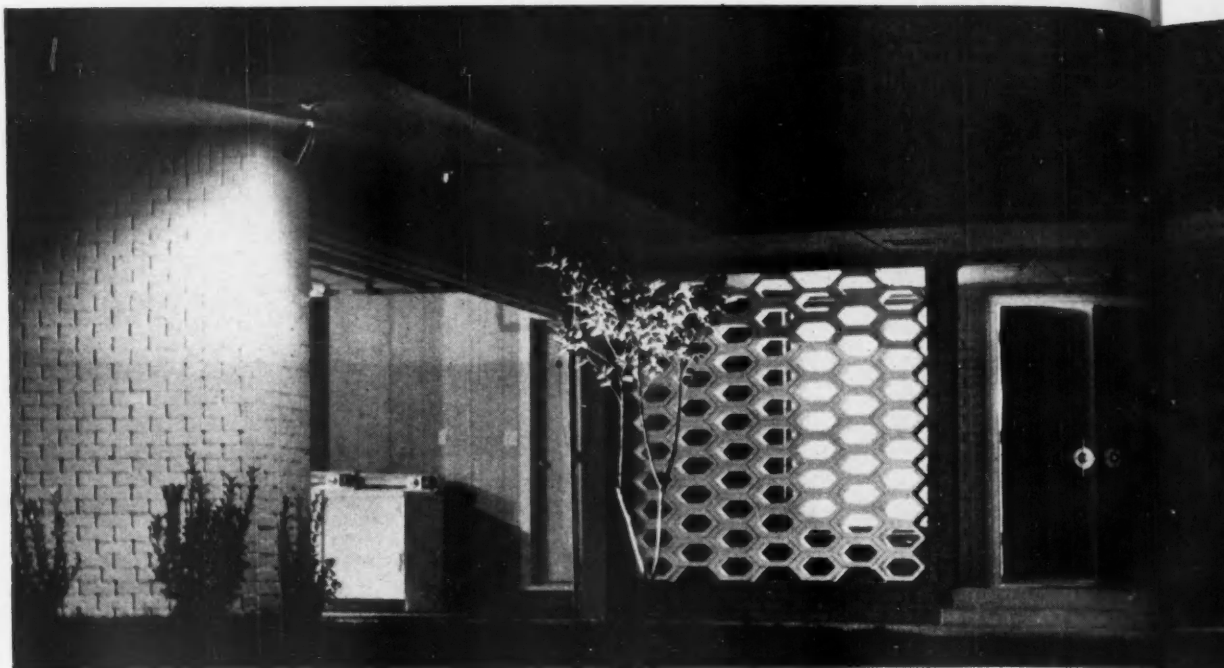
In the background of the hallway are red and green lanterns along the walls with 25-watt incandescent bulbs that lend a soft glow through the colored glass.

Turning to the right, the visitor goes aboard the mahogany deck of the good ship "White Cloud." The huge mast and boom, complete with sail and rigging, are part of an old stage setting in Hollywood. Above and on either side of the mast are more red and green lanterns.

In several of the lanterns, a special bulb is used which gives the appearance of a flickering candle
(Continued on page 62)



Ceiling of Papeete room holds numerous floats containing colored bulbs. Small accent lights give warm appearance to plant foliage.



"Light for Living Home" in Oklahoma City held two-week open house.

Model home raises lighting criteria

"Light for Living Home" draws nightly crowds in Oklahoma City

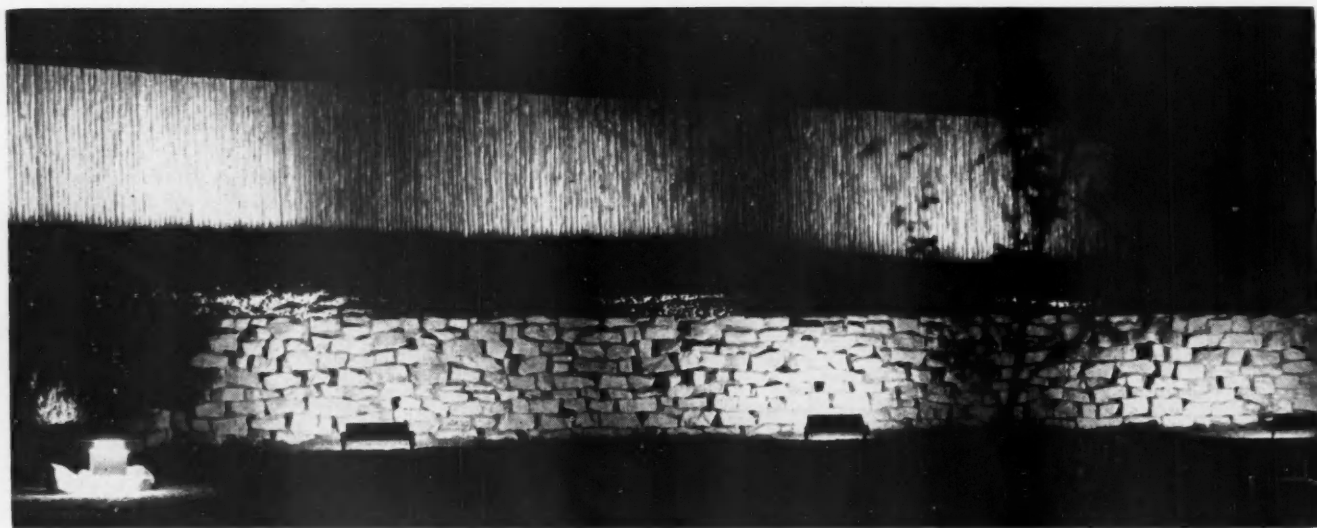
By W. U. McCoy, Lighting Field Editor, Oklahoma City, Okla.

◆ Long lines of visitors filed through a lighting showplace home in Oklahoma City each evening for

two weeks. Few of these visitors will ever be satisfied with less effective home lighting.

This major effort to acquaint builders, contractors, and most of

all, the general public, with what great attention to lighting can do to make a home more beautiful and more livable, is believed to be the most vivid home lighting demonstra-



Backyards can be interesting at night. Here light is placed to give separation and texture to retaining wall and fence.

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City

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R, 1960

tion so far in the Oklahoma area.

Built by Thunderbird Homes, with lighting designed by Marguerite Borelli and Dale Hampton, of Oklahoma Gas & Electric, the house at 3708 N.W. 64th attracted many special groups with a professional interest in lighting.

Lighting was designed with complete attention to both utility and artistry. The home was fully furnished and tastefully decorated. Room area, use, wall texture, lighting balance and emphasis, and types and styles of fixtures were all weighed carefully to achieve the most satisfying effects.

A TV program originating in the home, and then a large newspaper ad, whetted public interest. Public visits were invited October 16 through October 30, 6 p.m. to 10 p.m. daily.

"In this beautiful 'Light for Living Home'," the ad set forth, "you will see first hand how the magic of light can be tailored to emphasize the beauty of inside decor as well as outside landscaping. Lighting specialists will be on duty with information about the various types and features of lighting . . . and to assist you with your individual lighting plans."

Response was quick and strong.

LIGHTING for DECEMBER, 1960



Hanging pendants and brick add interest to this sitting room area.



Use of pendant shape again, in hallway to bedrooms, gives continuity.



Entrance hallway of the "Light for Living Home" featured recessed spots over planter, with pendant lamps against masonry.



Ceiling spots are spaced in front of the fireplace to heighten texture interest in the room, as well as to draw the eye to painting.

As visitors approached the lighting showplace they saw a welcoming atmosphere in plantings modeled by groundlights, bullet downlights at corners modeling brick of the home, an attractive masonry screen to the left of the entrance brought alive by backlighting.

Downlights used generously

A 150-watt downlight over the front door put ample light right where it was needed. Inside, two lights over each side of the entrance hall set an expressive tone for the tour. The two vertical lights on the left, just in front of the soft translucent drapes, highlighted the lush green of a planter. Two graceful pendant lamps, staggered on the right, contrasted with texture of brick behind.

Adjustable ceiling spots in the family room drew the eye next. The spots modeled fireplace masonry on either side of a painting. Lighting of the room is extended and balanced by reading lamps and three 150-watt recessed fixtures.

The dining room used three recessed downlights over the table area, in addition to three drop pendants and a wall bracket fixture.

Kitchen focal point was a round family table with a pull-down center fixture for cheerful informality. Five strip fluorescent counter lights spread light evenly over the counter work area.

Shape of the pendants was echoed in wall bracket lamps in the hallway to the bedrooms, and again in the first bathroom, which used two hanging pendants, with recessed incandescent in the bathing area.

The master bedroom featured five ceiling fixtures — four 75-watt downlights two feet from each corner, and one center fixture. Bath off the master bedroom had three compact fixtures over vanity and a recessed light in the shower.

Through sliding glass doors to the patio could be seen three bracket bullet lamps highlighting the masonry screen. And then, from the patio, the final treat of the tour for the nightly visitors was colored lighting bathing a rock retaining wall at the rear of the lot — cool lighting; and then warmer color tinting a stockade fence to the back and higher.

(Continued on page 62)

Guestroom of tomorrow displays new lighting

◆ What's ahead for hotel-motel guestrooms? Mrs. Marion Heuer, member of the board of governors of the American Institute of Decorators, sums it all up in her 1961 "Room of Tomorrow," with lighting as part of the design, the function, and the progress.

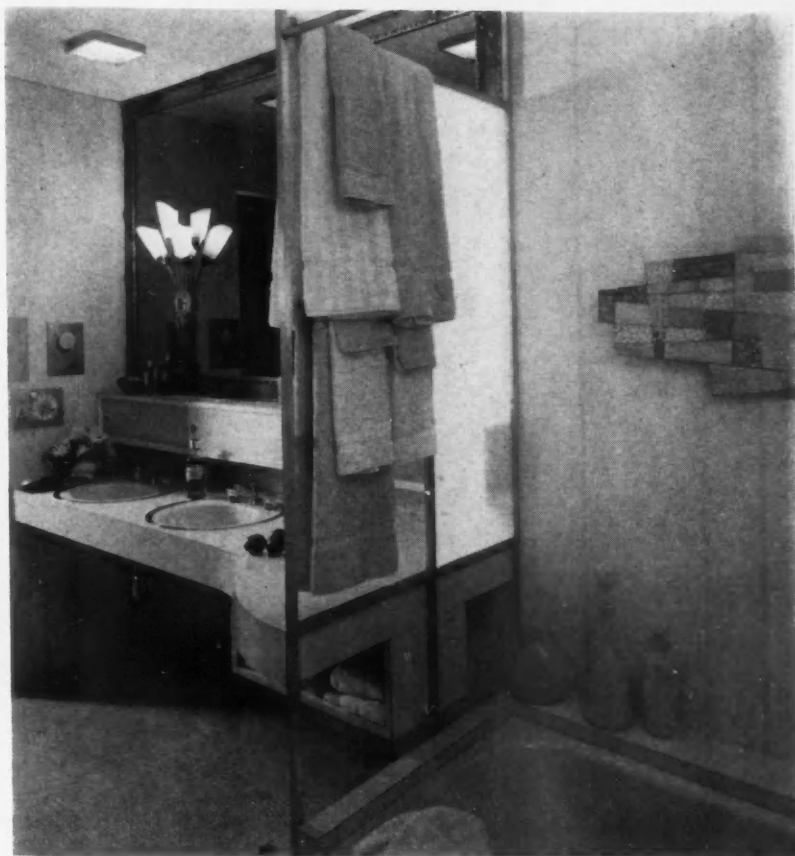
The model room is 20 by 36 feet over-all, including terrace, bath, and foyer. It is expertly planned around areas for dining, entertaining, sleeping, deskwork, and everything else for which today's guestrooms are used.

Explaining her plan for the room, Mrs. Heuer notes, "Today's hotel or motel room is more than just a place to spend the night. It is a show-room for a salesman to show his wares, an office for business conferences, and a place for a party. But it can also be a resort, sometimes a permanent apartment, and always a room where a guest should be happy and want to return."

In designing the lighting, Mrs. Heuer chose Lightolier Carnival pendants to add an accent of color and light to the dining area of the room. These are clean-lined, satin white cased glass, with a width of 6½ inches and a length of 12½ inches. Used with these is a three-light spreader with three arms.

In the kitchenette, the Corona, considered a new dimension in fluorescent lighting, was specified. Broadly-scaled yet extra-shallow

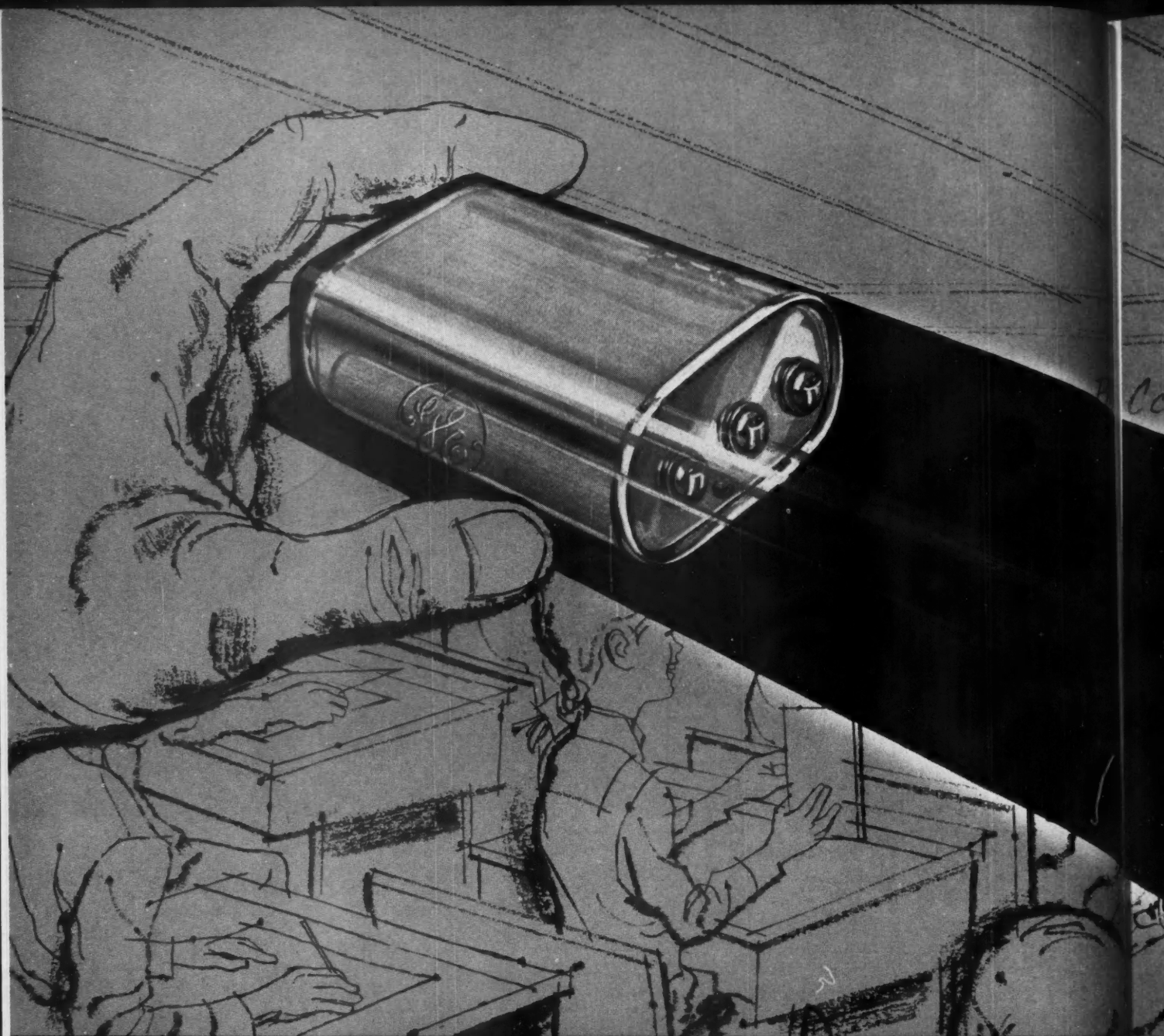
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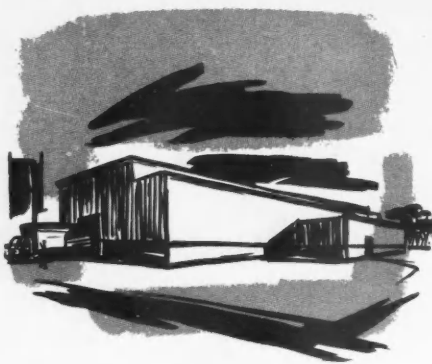
Light "sprays" are mounted through mirror in bath of "Room of Tomorrow." Twin Luxtrols on wall control light sprays and overhead lights.



Lightolier's Carnival pendants furnish light for entertainment area. View through kitchen door reveals Corona ceiling panel.



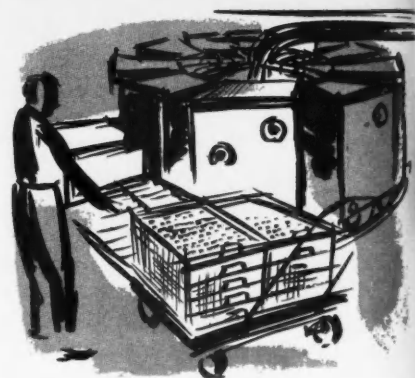
FOUR REASONS WHY GENERAL ELECTRIC CAPACITORS ARE Y



CONSTANT IMPROVEMENT. General Electric constantly seeks new ways of making better capacitors. For example, a \$2,000,000 foil rolling mill will be completed in 1961 for the production of special high-quality aluminum foil for smaller, higher quality capacitors.



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TRIPLE ASSURANCE. Every G-E capacitor you buy assures you of better ballast service in three ways: 1) Continuing product improvement, through continuing component materials developments, assures you of the highest value for your capacitor dollar. 2) G.E.'s high-speed, highly-mechanized production facilities provide unequalled delivery capability—assuring you of uninterrupted production continuity on your assembly line. 3) Automated processing and testing equipment assure you of capacitors consistently at the highest quality levels for your ballasts.

FOR MORE INFORMATION on how you can use General Electric's complete line of ballast type capacitors for better ballast service, contact your nearest G.E. Sales Office or write General Electric Company, Section 448-08, Schenectady 5, New York.

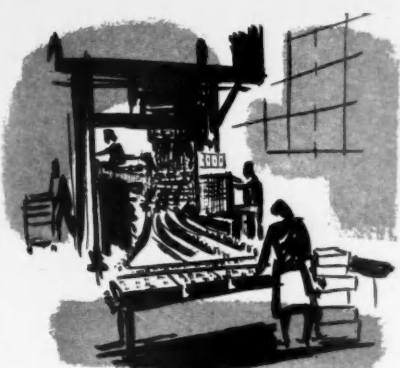
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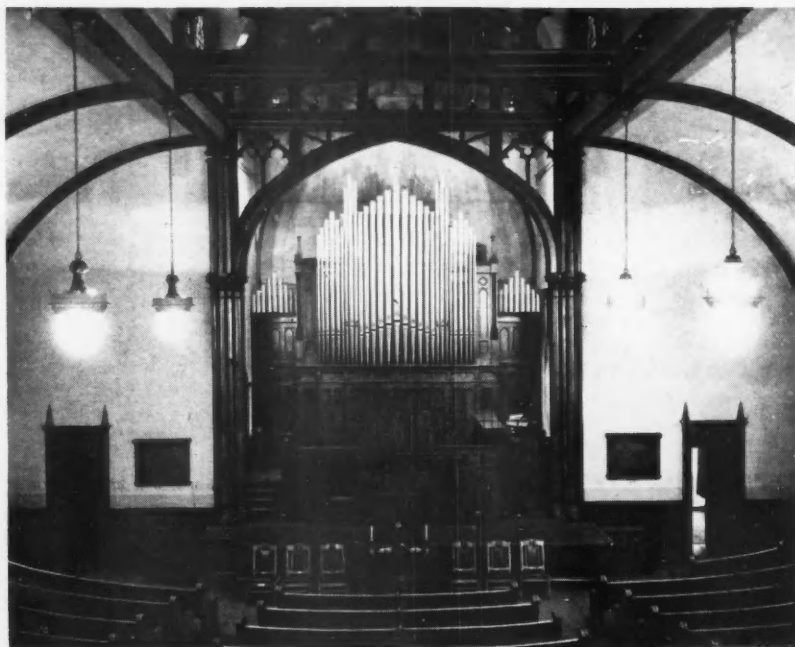
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Old lighting in the First Congregational Church of Burlington, Iowa, drew attention to side walls rather than to the dark altar area.

Directional

Dimmers and spots equip

By Leonard DeHoet, Supervisor of Residential and Commercial Sales, Iowa Southern Utilities Co., Centerville, Iowa.

◆ The congregation of the First Congregational Church in Burlington, Iowa, was confronted with a number of problems.

Their lighting was bad, their



Bullet-type louvered spotlights and floodlights now furnish illumination for the choir and chancel area, with Manning

English-Gothic fixtures selected to provide directional light for the main areas of the sanctuary.

nal

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ER, 1960

lighting for a traditional church

church lighting system to fit needs of services at various times

room surface colors were wrong, their structural surroundings were difficult from a lighting standpoint, their interior wiring was wholly inadequate, their service entrance was too small, and the pipe organ needed to be removed, among other things. The church board requested the assistance of Iowa Southern Utilities Co.

We drew up appropriate prints stipulating size of entrance, wire size, fixtures and placement of fixtures, reflectance values for the room surfaces, and approximate costs. We also recommended the installation of a dimmer for this application.

Main lighting fixtures

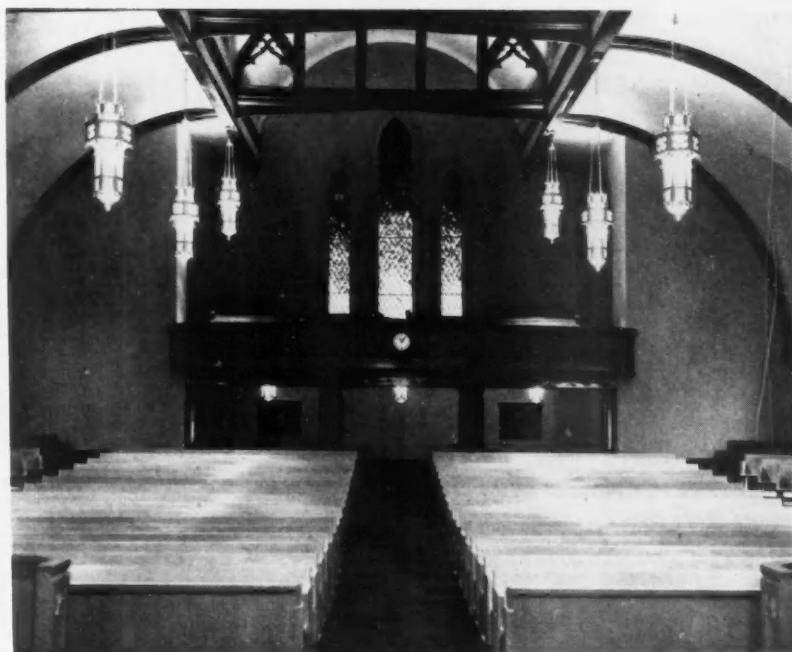
It is interesting and pleasing to note that every one of our recommendations were followed right down to employing the exact fixture that we suggested (English-Gothic type LPI-303 by the R. A. Manning Co.) This fixture offers up light, down light, and center light. The Manning fixtures in the sanctuary of the church were mounted at a height of 16 feet. From this position they can deliver up to 30 footcandles maintained illumination in the pews and at the same time furnish light needed for the overhead area.

The Luxtrol DMX-5000 2E 2P dimmer, manufactured by the Superior Electric Co., handled the dimming operation. The dimmer enables the pastor to select the amount of illumination he wishes from the lowest to the highest. The dimmer controls are located at the pulpit and also at the rear of the church. The dimmer applies only to the main fixtures and amounts to a 5000-watt dimming load.

(Continued on page 61)



This rear view of the church before remodeling shows how lighting gave a general flood effect rather than focusing on specific areas.



Design of the new lighting fixtures complements that of the over-all architectural design of the church. Dimmers add effectiveness.



Called the "White Room," this Hickok instrument assembly area features a lighting level of 300 footcandles.

Lighting lifts production

300 footcandles boosts quality 100 per cent



Employees had to wear jewelers' magnifying eyepieces under old lighting system, which gave 100 footcandles.



Luminous ceiling, using 8-foot, cool white, high output fluorescent lamps, helps gain assembling accuracy.

◆ A carefully controlled environment, featuring a lighting level of 300 footcandles, has boosted quality levels 100 per cent, output 50 per cent, and cut production costs 20 per cent, according to Paul P. Radecky, supervisor of production for Hickok Electric Instrument Co., Cleveland.

Called the "White Room," the factory assembly room is one of the finest industrial lighting installations in the United States, according to General Electric engineers.

"To be able to see potential defects before, we had to use jewelers' magnifying eyepieces. In the 'White Room' their use has been greatly reduced," Mr. Radecky reports.

Typical of the improvement is the case of one delicate meter produced under former uncontrolled environmental conditions and lighting levels of a little over 100 footcandles. The meter failed to pass rigid quality tests, in spite of careful inspection.

Taken into the new "White Room," inspectors easily located the

(Continued on page 61)



2' x 2' PLEXIGLAS lenses mounted in pairs, Southampton High School, Long Island.



1' x 4' PLEXIGLAS lenses mounted in continuous line, Ronkonkoma Primary School, Long Island. Architect for both schools shown: Frederick E. Allardt, Jr.

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LIGHTING for DECEMBER, 1960

Photocells for lighting application

These modern light control units provide contractors with an excellent opportunity to "sell up" their jobs

By William W. Barr, Sr., Ph.D.,
President and Chief Engineer, Dal-
bar Research Labs, Inc., Dallas,
Texas

◆ During the last few years the photoelectric cell type of control has come into its own in the electrical lighting field. There are three types now in use, the photoemissive, photoconductive, and photovoltaic. The photovoltaic cadmium sulfide cell is the one that is being most widely used because it requires no voltage source, being self energizing, which lends itself well to the manufacturer of this type of control.

Figure 1 is a photovoltaic cell with approximately 0.44 square inch of surface, with brass leads welded to the cell contact points. The entire cell is enclosed in a plastic box which is filled with another moisture resistant plastic filler. However, laboratory and field tests made with over 2500 of these cells in 1959 proved that they would not hold up in very damp atmospheres.

The plastic filler became saturated with moisture and the resulting pressure and temperature build-

up became too great causing the cell to blow up. In such cases the temperature exceeded 140°F. However, some manufacturers have cured this trouble by using a new formula of plastic which they have developed. Approximately 700 of the new type were field tested in automatic switches with a failure rate of less than 1%. It is recommended that this cell not be used in temperatures exceeding 140° F, or 250 volts, a-c.

Figure 2 is another type of photovoltaic cell with approximately 0.80 square inch of surface. This cell is hermetically sealed in glass with a metal cover which is also welded. The contacts come out of the back of the cell through two glass beads. To date over 3000 of these cells have been lab and field tested without one being returned because of failure.

A severe test starting January 10, and ending August 10, 1960, was put on this cell by connecting it through a relay to a load of 1000 watts of incandescent light. It was operated 100 times daily until a

total of 21,000 actual on and off operations was reached, a period of 210 days. The voltage across the cell was constant at 315 volts, a-c.

Both temperature and voltage were in excess of the cell's rating.

Purchasers of outdoor photocell controlled automatic switches using this type of cell will have few photocell problems. There are several manufacturers of such hermetically sealed photovoltaic cells.

Figure 3 is a recent addition to the photovoltaic cells now available. As can be seen this is a square cell surface, in the same type of enclosure as shown in Figure 2. This cell uses the same unit as the cell described in Figure 1. This one is also hermetically sealed and has passed all the tests outlined for the cell described in Figure 2.

Figure 4 is a photoconductive tube, and one of the newest photovoltaic cells on the market. This tube is a large area, side illuminated, hermetically sealed, photosensitive device that has been designed to be used in outdoor lighting controllers. The sensitive element is a layer of

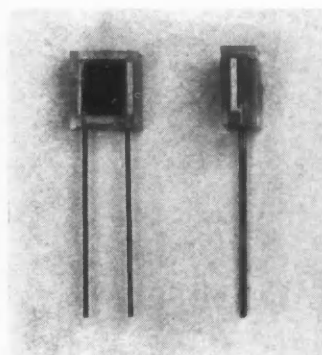


Fig. 1 — A photovoltaic cell with approximately .44 square inch surface.

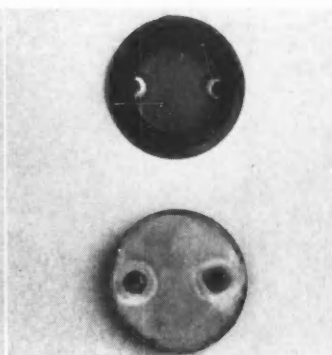


Fig. 2 — Hermetically sealed cell having .80 square inch active area.

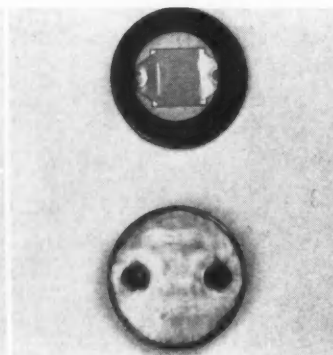


Fig. 3 — Hermetically sealed photovoltaic cell with .44 square inch area.

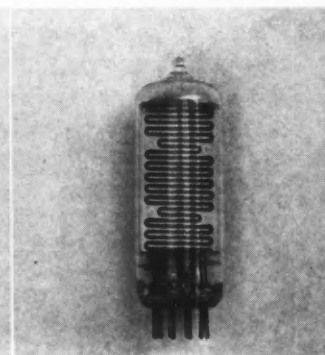


Fig. 4—Large area, side illuminated photosensitive device in 9-pin tube.

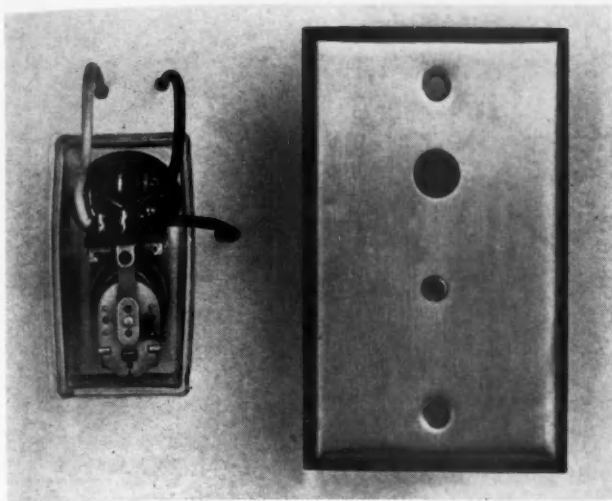


Fig. 5—An automatic photocell switch mounted on switch plate, designed to control 500-watt load.

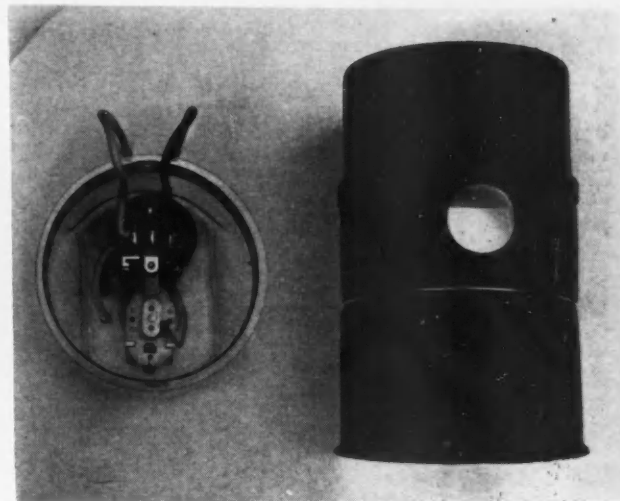


Fig. 6—A control unit similar to that of Fig. 5 but designed especially for the control of post lanterns.

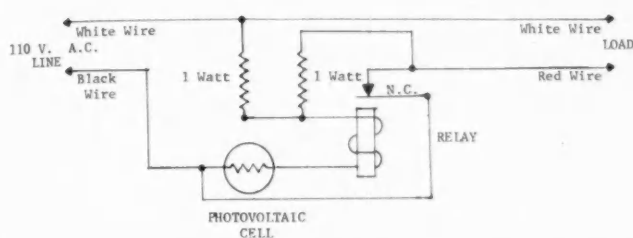


Fig. 7.—This is the circuit used with devices shown in Figs. 5 and 6 for control of 500 watt load.

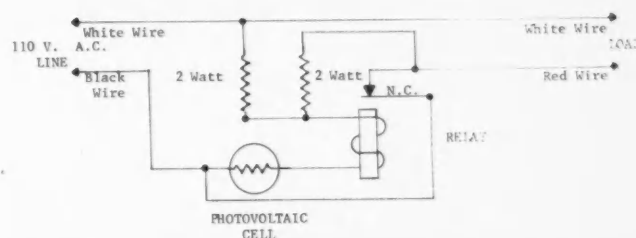


Fig. 8—This circuit is used with units that control 1500 watt load. (Cells not in circuit in N.C. position.)

cadmium sulfide deposited on one side of a ceramic plate. Contact to the cadmium sulfide is provided by the interleaved "comblake" metallic electrode structure that is deposited over the cadmium sulfide layer. This plate is mounted in a hermetically sealed conventional 9-pin miniature tube envelope. Connections between the element and external circuitry are made through the tube pins.

Figure 5 shows a picture of an automatic photocell controlled switch and the basic unit used. This model is designed to control 500 watts of incandescent light. The basic unit is sealed in a plastic box that is mounted to the stainless steel plate. It uses a fully insulated relay with points capable of handling 750 watts.

The cell is a hermetically sealed type mounted at a 45° angle to the aperture in the plate. This prevents auto lights and other short term flashes from activating the unit. If installed according to the instructions, the electrical contractors using this unit will have no trouble.

A very similar unit is available but designed to control 1500 watts of incandescent light. The relay is also fully insulated and has points capable of handling 2000 watts.

Figure 6 is a 500-watt post lantern adapter also showing the basic unit used, with the same circuit as the one in Figure 7. This adapter has the added feature of being adjustable as to the on and off time. The cell is mounted on a 45° angle facing the bottom of the adapter. It has a white reflector for the light to reflect to the cell, which can be raised or lowered to alter the on and off time to suit the purchaser. All of the above units are set to activate the lights at 3 footcandles, and turn them off at 6 footcandles.

Figure 7 shows the circuit of the units shown in Figures 5 and 6, which handle 500 watts. This circuit is designed around a normally closed relay. When light is on the surface of the cell it activates the unit and opens the relay contacts which break the circuit to the lights and keeps them off during the day.

When light leaves the surface of the cell, the relay is deactivated and lets the points close, completing the circuit and activating the lights.

Figure 8 reveals the circuit of the 1500 watt unit. The only difference in the circuits is a heavier relay coil and the size of the resistors used.

We have described the photovoltaic CdS cells and several types of switches and controllers using these cells. We will now consider the applications of these controls.

For lighting control they can be used for street lights, residential lighting, floodlighting, industrial floodlighting, area lighting in filling stations, display lighting, (store windows, etc.), highway signs, and neon signs.

For industrial control they can be used for slow speed counting, door openers, safety controls, and burglar alarms.

Residential uses are: TV brightness control, "switchless" lights, garage door openers, camera iris controls, flame detectors, yard

(Continued on page 60)



High intensity lighting is one of the principal safety features of the Savannah Go Kart track.

Safety lighting for a Go Kart track

By Leon R. Case, Jr., Lighting Engineer, Savannah Electric and Power Co., Savannah, Ga.

◆ Go Kart racing is sweeping the country and many tracks of various designs are being built for these miniature demons.

Powered by small horsepower engines, it is possible for these machines to achieve speeds up to 80 mph or more. Precautions are taken that only those machines that meet requirements as to brakes, throttles, and tires are allowed to participate in the races.

Safety rules must be understood by all drivers and strictly adhered to. Of the many safety precautions installed at the Savannah track, the most important one is the lighting system. The group of business men who built this track agreed that a good lighting system was necessary for safety and for the spectators.

Races on the track are matched for adults, children, and teenagers. Those drivers with considerable experience are given handicaps to



Three youthful contestants are ready for a Go Kart race. Lighting poles had to be placed so as not to create a hazard on the tracks.

make these races more nearly matched. Championship races are preceded by time trials so races will be more exciting, as well as more evenly matched. Several evenings a week are set aside for people who would like to rent a Go Kart and try their hands at being a "Barney Oldfield."

Many problems arose with the design because of the many turns in

the track and the need of placing poles so as not to create a hazard to these little vehicles in possibilities of collision. The over-all cost was also very important. With cost of current and fixtures in mind, this system was designed to use the 1000-watt mercury vapor lamps. Since footcandles were the primary necessity, it was decided not to use
(Continued on page 59)

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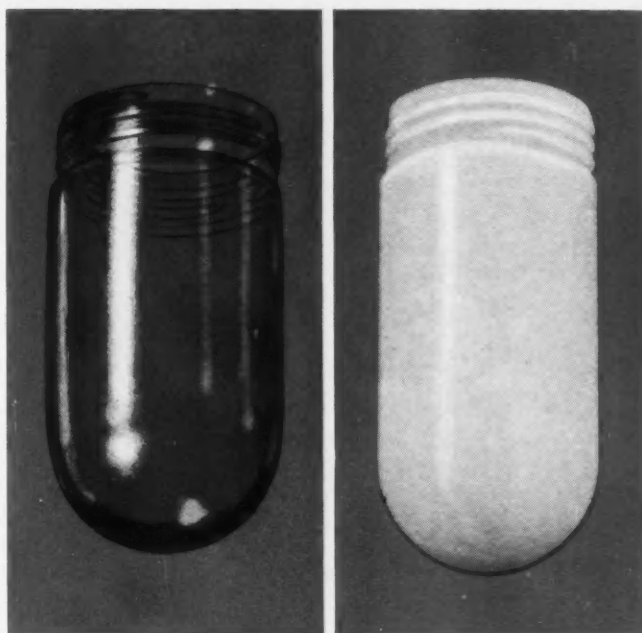
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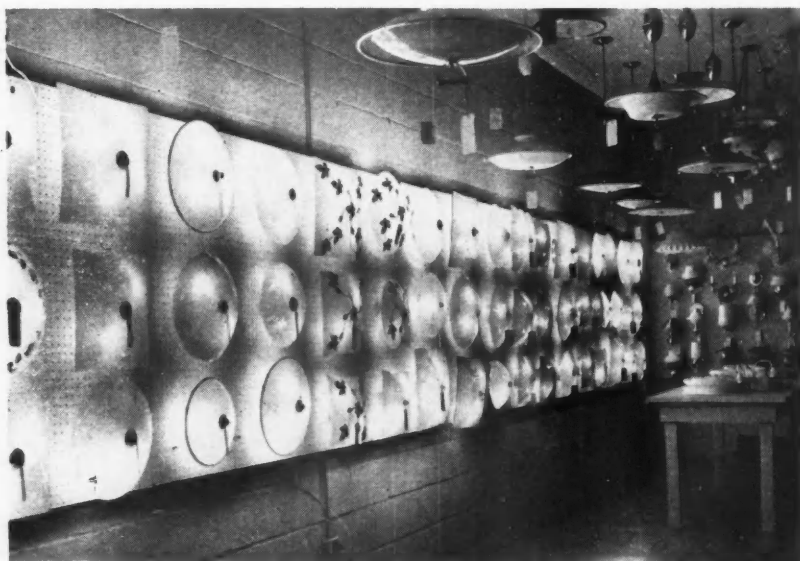
THATCHER GLASS MANUFACTURING CO., INC. JEANNETTE, PA.

Fixture wholesaling

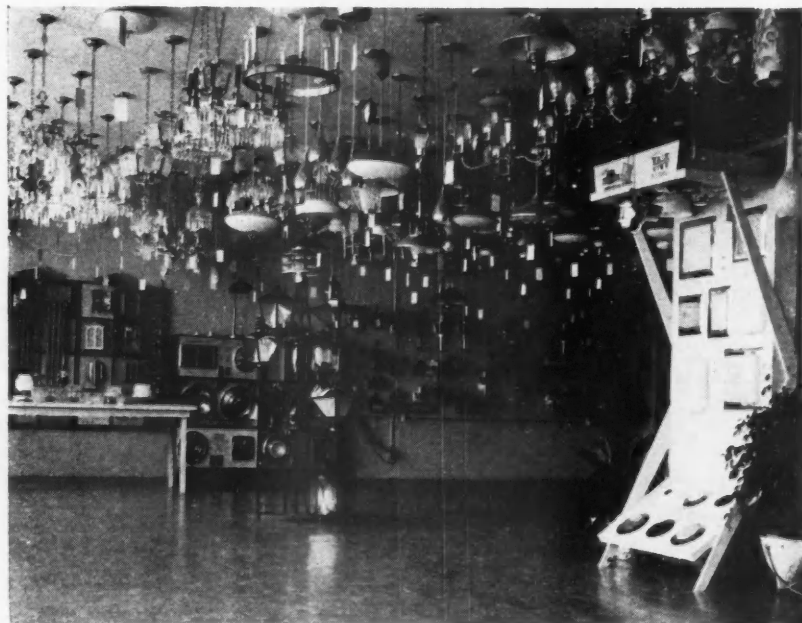
New service for contractors fills complete lighting needs immediately



Mrs. Carpenter and salesman Eddie Grant check details before delivery.



The company's showroom is set up to display 2,000 fixtures in its 2,500-square foot area. Ninety different lines are represented.



By W. U. McCoy, Lighting Field Editor, Oklahoma City, Okla.

◆ Oklahoma City electrical contractor Edward Carpenter, in the business for 15 years, had nursed a long-standing complaint.

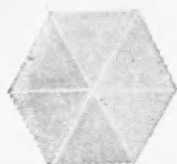
Far too frequently he had to waste time with multiple calls and trips, or delays on orders, for some particular fixture or other material urgently needed for a job.

The Carpenter family went to work on a solution. The result is a thriving new business which has largely solved the problem for area contractors. The new business, C. & C. Electrical Supply, wholesale, managed by Mr. Carpenter's wife and son, James, has some new approaches to supply.

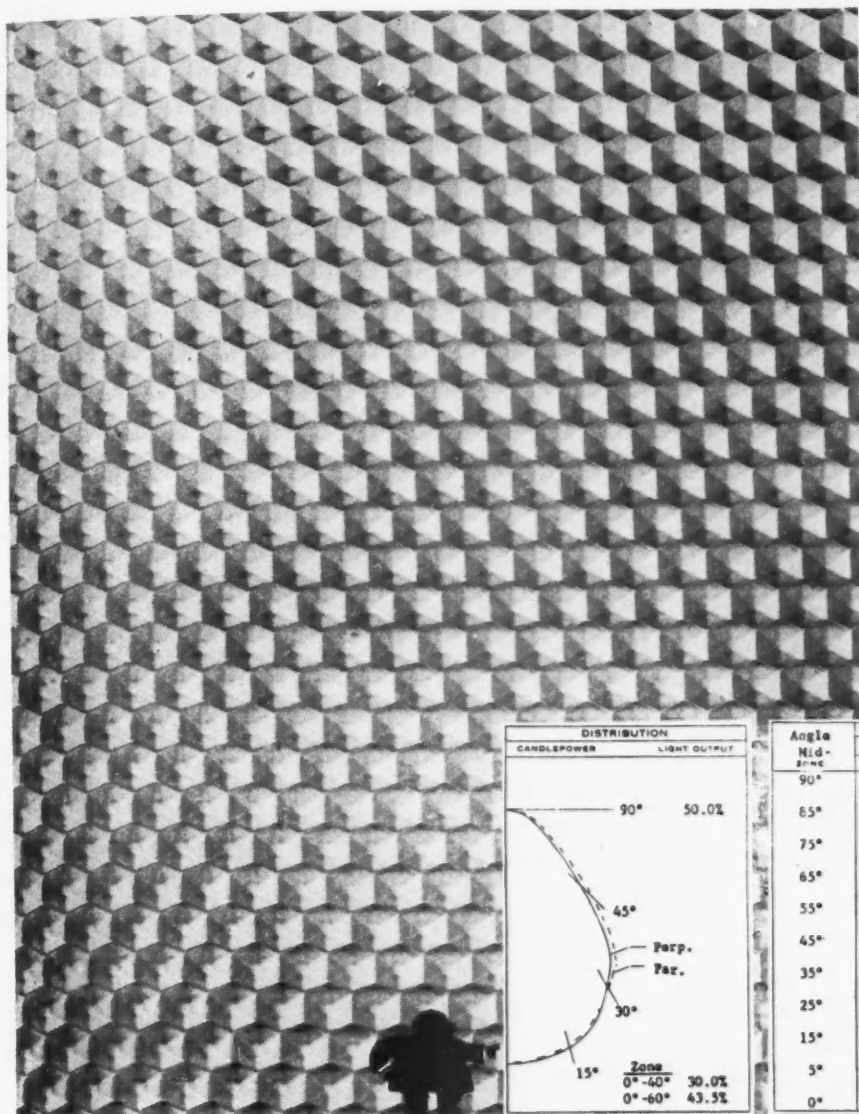
The firm has tried to do two things, first of which is to fill the big need as the Carpenters saw it, that of offering a one-stop service where contractors could get all they needed of exactly what they needed.

This newest showroom in Oklahoma City carries in stock 90 different lines of fixtures and everything needed to do a complete lighting job. The show room is set up for display of 2,000 fixtures in its 2,500-square foot area. Another 3,000 square feet of storage area is stocked in depth, which means floor to ceiling.

(Continued on page 59)



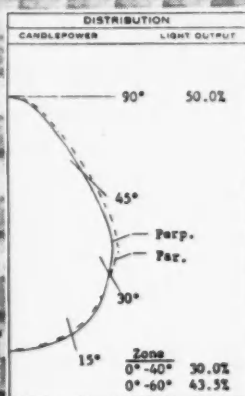
announcing the New EXTRU-LITE® Pattern **R-7**



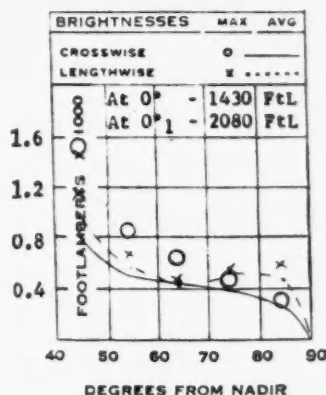
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65°	176		200		179	188
55°	317		313		279	274
45°	653		620		554	472
35°	1003		1000		970	625
25°	1177		1198		1196	551
15°	1281		1293		1301	365
5°	1334		1335		1338	127
0°	1341		1341		1341	



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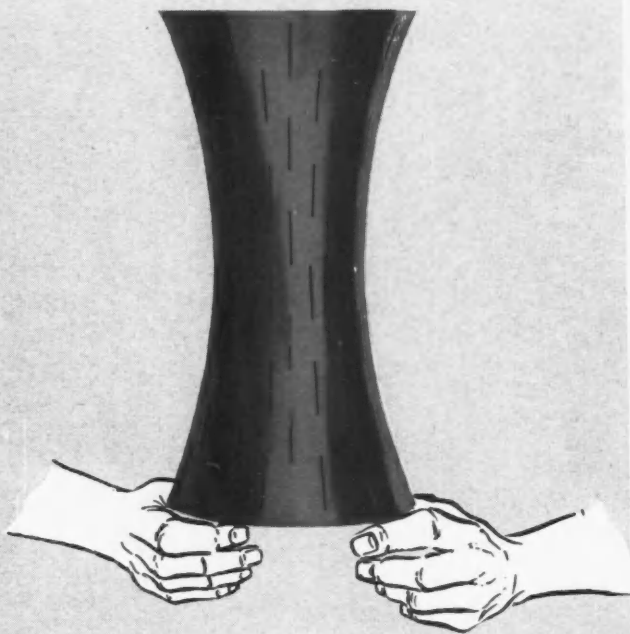
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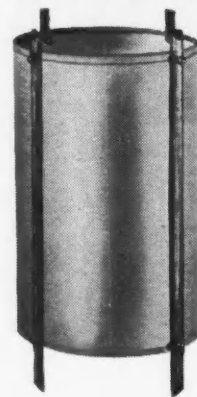
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Economists see mild dip in 1961

But large majority of those participating in recent poll believe that economy will move upward again by late 1961

By Edwin W. Magee, Jr., Economist, and Edward A. Sprague, Associate Economist, F. W. Dodge Corp.

◆ One year ago the nation's leading economists polled by F. W. Dodge Corporation were mildly optimistic about the prospects for 1960 but they "had somewhat more doubts about the longer range, 12 to 18 months ahead."

In this year's survey, these doubts, for the most part, have been confirmed. At least two-thirds of the economists currently feel that business activity will slacken somewhat during the next six to nine months, although a large majority expects the economy to be moving upward once again by late 1961.

The general feeling among this year's participants seems to be that some corrections have already taken place in the economy during the past several months and that this will serve to lighten the severity of the expected downturn.

A number of economists pointed to this year's presidential election and based their forecasts upon the specific assumption that one or the other candidate would be victorious. One actually included two separate forecasts, taking both candidates into account. On the whole, however, the majority of economists did not engage in hedging and their expectations were not qualified by any ifs, ands, or buts concerning the election results.

Although it is seldom easy to boil down the collective thinking of so large a group of economists into a composite, this year presented more than the usual difficulties. As in the past, we have summarized the replies and averaged the numerical estimates. However, such a procedure sometimes fails to yield a realistic picture, and this seems to

have happened in the current survey, particularly with reference to the economists' thoughts on future trends in the major indicator—the gross national product.

For example, the median estimate of the 327 economists shows that the GNP will edge up very slightly from \$505 billion in the second quarter of this year to \$507 billion in the second quarter of 1961; then move upward more rapidly to \$515 billion by the fourth quarter of next year. Actually, this represents the specific view of very few economists. What has happened is that the median represents the half-way point between a number of widely divergent opinions.

Divergence of views

A sizeable group (30 per cent) of the respondents feel that the economy will show no downturn at all between now and the end of 1961. On the other hand, the majority (67 per cent) expect some downturn during this period, but there is considerable disagreement as to when the low point will be reached. Since the timing of the low point is so widely dispersed, much of the downward effect in any given quarter is cancelled out and the median reflects the "no man's land" between the "steady ups" and the various downward patterns.

A special analysis of the replies from 50 large manufacturing companies indicated that this group was somewhat less optimistic than the average. However, the median replies from these particular respondents probably shows a clearer picture of the pattern of the majority opinion. For example, the average expectation of these 50 economists indicated that business activity, as

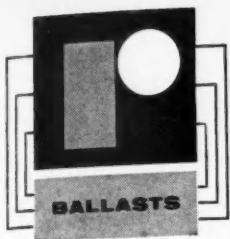
measured by GNP, will rise through the end of this year, then turn downward, reaching a trough in the second quarter of 1961 followed by recovery in the final half of next year.

Several factors seem to provide the basis for concern over next year's prospects. Among them are the following: lack of enthusiastic consumer demand, the squeeze on corporate profits, overcapacity in many industries, expected reductions in capital expenditures, continued high levels of unemployment, and the inventory correction now under way.

On the other hand, while the consensus definitely points to some degree of recession in the year ahead, most of those who feel a downturn will occur are just as confident that the dip will be relatively mild and of fairly brief duration, with recovery setting in during the latter half of 1961. (Only ten per cent think that the economy will be in a downturn at the end of next year.)

Summary of opinion

A manufacturing corporation economist summarized what seems to be the basic reasoning of the majority as follows: "The standard forecast is that 1961 will be a 'recession year,' and there is a great deal of evidence from conventional economic analysis to support this view. Nevertheless, several factors of strength should be kept in mind: (1) business managements have already noted the slow-up in sales and many adjustments are now behind us; (2) the impending downturn in plant and equipment—while important—nevertheless comes at a time when our economy is less heavily weighted by manufacturing than non-manufacturing, especially



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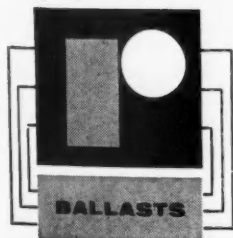
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service, activities; (3) the economy has successfully weathered a fairly sharp economic change from a federal deficit to a modest surplus; (4) business psychology, which tends to swing violently, may well be too cautious toward 1961 prospects; (5) sharp economic setbacks invariably follow periods of unsustainable activity—few such obvious excesses now exist, so no deep slide should occur in 1961; and, (6) a new administration will have some new ideas.”

This year's survey once again set a new record for the number of participants included — exceeding the 300 mark for the first time. Of the 327 economists whose opinions are summarized here, 36 were in financial organizations and insurance companies, 190 from other business firms, 55 from colleges and universities, and 16 from government; the remaining 30 are consultants or officials of trade and research organizations.

Details of replies

The economists surveyed were asked to present specific forecasts for the remainder of 1960 and for 1961 for a number of major economic indicators. Some omitted replies to some parts of some questions, but there were more than 300 replies to some parts of some questions, except for the question on interest rates where a slightly smaller number replied.

As in the past, we are summarizing the numerical estimates of the economists by using the median estimates and the “50 per cent range”—that is, the range within which the middle 50 per cent of the estimates fall—to give some indication of the divergence of opinions.

Gross national product

As we pointed out earlier, the median expectation of the economists is that the gross national product will inch gently upward from \$505 billion in the second quarter of this year to \$507 billion in the second quarter of 1961, and then move ahead more sharply to \$515 billion in the final quarter of next year. We also pointed out that the median does not seem to reflect the general consensus of the economists. Actually there is a notable widening

spread of the forecasts, and the 50 per cent range (that is, the 25 per cent of the replies on each side of the median) is quite wide by the second quarter of 1961, ranging from \$498 billion to \$512 billion. This spread continues through the end of 1961, with the total range extending considerably further downward than upward, indicating somewhat less optimism than shown by the median.

Most of the economists expect the GNP to reach a low point and to turn up again sometime before the end of 1961. Some 90 per cent see the economy in a rising trend by the fourth quarter of 1961.

Industrial production

The expected dip in economic activity in the months ahead is more clearly reflected in the economists' forecasts of industrial production as measured by the Federal Reserve Board index. On a seasonally adjusted basis, the index stood at 109 in June 1960 (1957—100). The median expectation is that production will drop to 108 in December of this year, then down to 107 by June 1961, after which it will rise moderately to 110 by the end of the year.

However, the 50 per cent range, which is fairly narrow for December of this year, widens substantially at mid-1961, running from 102 to 111. This spread is maintained through the last half of next year as well.

Industrial production is forecast to dip more perceptibly than GNP chiefly because of two factors. First, the index of industrial production is in terms of physical volume while GNP is measured in dollars. Since the average expectation of the economists is that prices will continue to rise, although slowly, during the forecast period, the increases will tend to raise the GNP level without affecting the industrial production index. Secondly, and more important, there seems to be rather general agreement that manufacturing industries will bear the brunt of the recession, reflecting plant and equipment cutbacks and inventory corrections.

Consumer prices

Continued rise in consumer prices is the expectation of most of the

economists. The consensus, however, is that the rise through 1961 will be no more than a “creep” with the median forecast of the consumer price index at 128.0 in December 1961, barely one per cent above mid-1960. The 50 per cent range of forecasts runs only from 127.0 to 128.7 for December 1961, and there was a decided preference for 128.0 as the mode.

Despite the popularity of the 127-129 range, 11 per cent of the economists think the December 1961 index will be lower than the 126.5 figure reported for June 1960. This proportion of price “bears” is considerably higher than found in the surveys for 1959 and 1960.

Quite a few economists remarked that a mild recession in 1961 would act to weaken if not halt the upward price movement. Still, the undercurrent of feeling was that the long postwar inflation would continue and reassert itself particularly in the second half of next year. Price increases are expected to be concentrated in the food and services sectors.

Wholesale prices

Wholesale prices will inch up in 1961, but by less than the increase in consumer prices according to a majority of economists polled. Both the median and modal estimates of the wholesale price index for December 1961 are 120.0, not quite half of one per cent above the June 1960 mark of 119.5. Again, the 50 per cent range is small, extending only from 119.4 to 120.7 at the end of next year.

Actually, in this year's survey, a fair segment of the economists expect some decline in wholesale prices. Twenty-four per cent of them set the December 1961 index lower than mid-1960.

Total new construction

Total new construction is expected to fall off slightly in the second half of 1960, with the median forecast of the seasonally adjusted annual rate at \$54.9 billion. Next year, the economists look for a slow recovery, the median and modal forecast for the second half of 1961 settling on \$56.0 billion.

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ticularly for the first half of 1961, when several economists expect the annual rate to be below \$50 billion, but only two set it higher than \$59 billion.

It was generally concluded that points of strength next year will be residential building and public works, while non-residential building will slacken.

New housing starts

Private non-farm housing starts averaged 1,275,000 on a seasonally adjusted annual rate basis during the first half of 1960. The economists' median forecasts are for an annual rate of 1,250,000 in the second half of 1960, then a gradual step-up in the rate to 1,300,000 in the first half of 1961 and 1,350,000 in the second half of 1961. Similar to the new construction estimates, the 50 per cent range reaches further downward than upward in both halves of 1961. There is a definite modal preference for 1,400,000 in the second half of 1961 but with a long, thin trail of forecasts from 1,250,000 on down comprising the lowest quartile.

Plant, equipment expenditures

New plant and equipment expenditures will decline in 1961 according to a heavy majority of the economists polled. The median forecasts for both halves of 1961 are \$35.0 billion (seasonally adjusted annual rate), which would represent a five per cent decrease from the estimated \$36.9 billion rate for the second half of 1960.

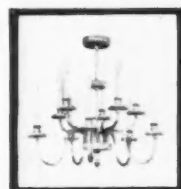
Actually, most of the economists expect a divergent pattern for the two halves of next year, but the forecasts of an early dip tend to offset those looking for a weaker second half. The whole range of forecasts is thus very wide. For the second half of 1961, 18 economists anticipate plant and equipment expenditures to run at \$30 billion or under, while 16 put the rate at \$39 billion or more.

The economists were asked to indicate whether 1961's average hourly wage trend would be up, down, or unchanged in the categories of durable goods manufacturing, non-durable goods manufacturing, and building construction.

One economist, after checking the
(Continued on page 58)

Just a Glimpse

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Utility boosts lighting demand through 12-week training program

◆ Lighting demand is growing in the Little Rock, Ark., area as newly trained consultants study why and how to promote better illumination.

Behind the plan is the Arkansas Power and Light Company's new 12-week training program in lighting sales promotion and education. This new "Academy of Lighting Arts" teaching package is especially designed to emphasize home market sales.

Residential lighting accounts for approximately 25 per cent of the kilowatt-hours presently consumed by some 265,000 residential and rural customers of the Arkansas power company, and a well planned campaign lies behind the new emphasis on this key market.

One of the first steps was the promotion of two company employees from the field to head up a residen-

tial lighting staff. Edward L. Linebarger, former commercial sales representative with ten years experience, was appointed director of residential lighting promotion. Assisting him is Franklin W. Griffin, former customer service representative with six years utility sales experience. Headquarters for both is the company's General Office Sales and Development Department in Little Rock.

Also boosting the program are five home lighting consultants, specially trained women located in three of the company's divisions. Out of 2,161 calls, the consultants recently gained 229 kilowatts in lighting sales. "We're gathering momentum in educating the public all along," one consultant reports, "the customer now seeks us and wants to know about good lighting."



Edward L. Linebarger, right, director of residential lighting promotion for Arkansas Power and Lighting Co., and assistant, F. W. Griffin, set up for typical class of "Academy of Lighting Arts."

Graduation certificates were presented to 96 out of 111 enrollees in the company's first training program. Graduates report that knowledge gained from the new course is giving them confidence and know-how to recommend the new IES lighting levels to customers.

The initial stage of the lighting course was centered around the "Academy of Lighting Arts" program, which contains such teaching items as slide projectors, films, display and demonstration equipment, and additional instructional material.

Primary function of the academy is to train certified lighting consultants, Mr. Linebarger explains. Presentations are concentrated on two major areas — education and sales promotion. Trainees include retail lighting sales people, builders, contractors, distributors, architects, interior decorators, teachers, feature writers, company personnel, and other interested groups.

Training schedule

During the first schedule of the training course, sessions were held once each week for 12 weeks. During this time, Mr. Linebarger and Mr. Griffin traveled to four major Arkansas cities — Little Rock, El Dorado, Hot Springs, and Pine Bluff — taking the academy training aids to a different city each night. Meetings were scheduled from 7 p.m. to 9 p.m. At the end of 12 weeks, four more towns were scheduled. This plan will continue until all towns are reached.

It is expected to take about 18 months to cover the properties of the company. During the days, when time permits, the two instructors visit dealers and sales allies' employees in the lighting field.

Attendance has well exceeded expectations, Mr. Griffin, lighting sales coordinator, reports. A 93 per cent attendance figure has been maintained even though some trainees must drive 50 to 60 miles, sometimes over bad roads, to attend.

Attendance factors

Instructors Linebarger and Griffin attribute the high attendance to three key factors: (1) a desire to know more about residential lighting, (2) a \$25 tuition per student, (Continued on page 58)

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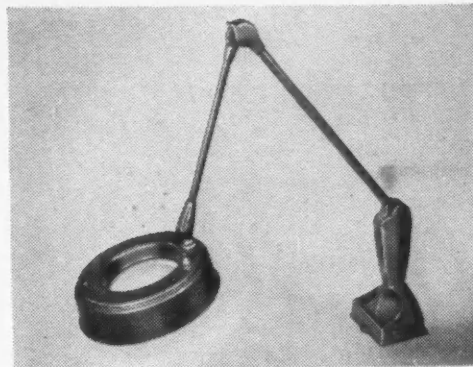
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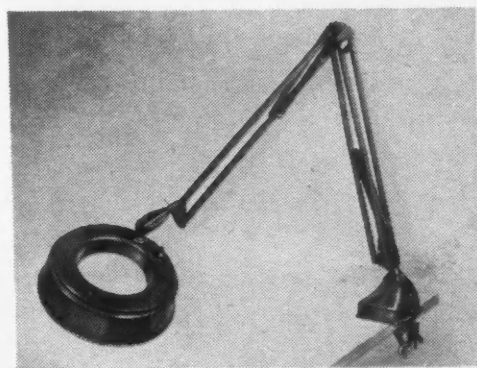
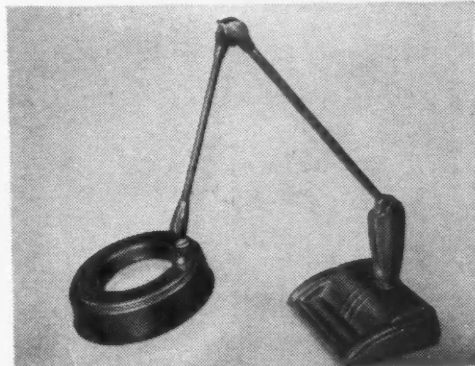
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^{*} New FROST-WHITE-SE* grade sheet is guaranteed to puzzle even the most knowledgeable fire marshal. No heroic counter-measures are required either, since melted, flaming particles extinguish themselves long before reaching any flammable materials below.

*Trade Mark. Sheffield Plastics, Inc.

New FROST-WHITE-SE Styrene Sheet

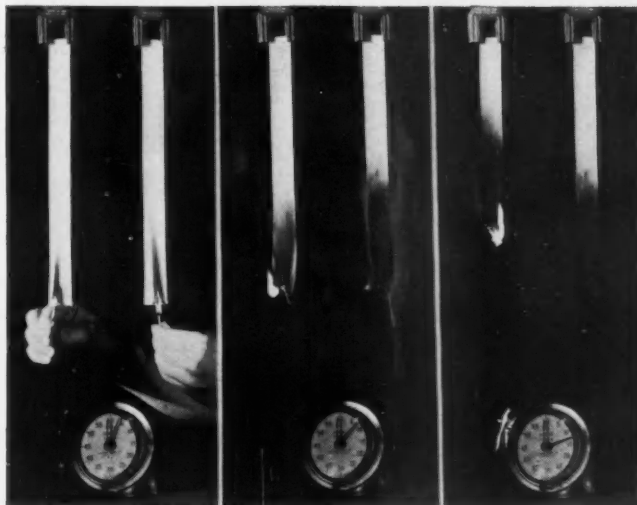
Overcomes Major Problems of All-Plastic Ceilings

Now you can take advantage of the superior performance of vacuum-formed styrene sheet or pans for installations where the plastic covers most of the ceiling. Sheffield Plastics' new FROST-WHITE-SE styrene sheet not only meets the N. Y. C. building code self-extinguishing requirements, but overcomes the problems of premature discoloration and lack of rigidity of vinyl sheet now so widely used. Its characteristics include:

- **SELF EXTINGUISHING**—Passes N. Y. C. Building Code, Group A, Underwriters' Test Lab, Group 2 and ASTM Test D-568-56T, can thus be used in all-plastic ceiling installations.
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- **BREAK RESISTANT**—Withstands severe impact and can be twisted as much as 180° without breaking. Cuts breakage in handling and shipping.
- **EFFICIENT**—Has high light transmission (up to 60%) in sheet thickness of 0.025". Increased thickness, compared to 0.015 or 0.020" thick vinyl sheet simplifies handling and installation.

Test of regular styrene at left vs. new FROST-WHITE-SE styrene at right using method similar to A.S.T.M. method D-568-56T. Note flaming vs. self-extinguished styrene particles around clock in photos 2 and 3.

NOW AVAILABLE in volume production, FROST-WHITE-SE styrene sheet is readily processed by vacuum formers in shapes to meet your installation requirements. Sheffield, of course, produces only the sheet in thicknesses of 0.025 and 0.040 inches.



TECHNICAL DATA AND PRICES OF FROST-WHITE-SE styrene sheet are readily available. Address your requests to the nearest Sheffield sales office or to Sheffield Plastics, Inc., Dept. 04-A, Sheffield, Massachusetts.

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Contracting firm develops method for special fixture installation

◆ The installation of lighting fixtures on large jobs can often be facilitated by the development of special tools, rigs, etc. As an example, Oklahoma Electric Supply Co., a major Oklahoma City electrical contracting firm, recently devised a special tool for the installation of 1700 4- by 4- and 2- by 4-foot lay-in fluorescent fixtures on a major shopping center contract.

Two special rigs were built, which Oklahoma Electric Supply Vice-President E. Griffy, Jr., said paid for their investment five times on this one job. In addition to labor savings, the firm was better able to

meet the completion date. Labor saving was placed at 50 per cent over a normal scaffold operation. With the two special rigs and only two men required per rig, the firm was able to install 100 fixtures a day.

The rig developed was a powered hoist which took fixtures from a rack and ran them up on a vertical track. A ball and socket swivel arm allowed the 80-pound fixtures to be angled through openings.

Two-piece Unistrut was used, with rollers working on the frame. The vertical traveling piece was controlled by winch line and pedal,

powered by a 1/4-hp reversing type, single-phase motor. The up-and-down track arm had crosspiece "fingers" on which the fixtures would rest. The vertical track was adjustable for various ceiling heights.

Foot-operated switches raised and lowered the hoist. One man was used on the floor, one on the hoist. Fixtures were delivered in bulk, in a rack of trays which could be rolled around the floor.

Another large-job method used by Oklahoma Electric in industrial work is the practice of "rolling" fixtures into position.

For example, while working recently in a building area over 250 feet long, the crew worked from a fixed scaffold with a tracked, roller-type hanger. The time of moving a scaffold was thus eliminated, as fixtures were rolled down the track to the next installation point. The problem of getting around obstructions on the plant floor was eliminated, also.

Sawhorses prove useful in fixture pre-assembly

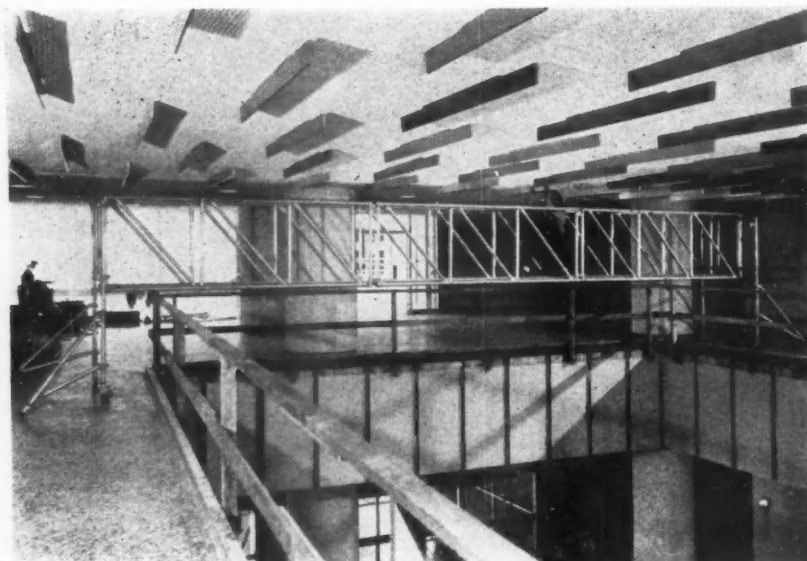
By John Gabrio, Gabrio Electric Co., St. Petersburg, Fla.

◆ Our job in an electronics communications plant was to install approximately a thousand two-light, 8-foot high output industrial type fluorescent fixtures in 192-foot rows, for a total of 40 rows.

Obviously, the more fixture pre-assembly you can make prior to ceiling installation, the more economical and profitable the job will be. One of our foremen came up with the idea of making a series of wooden sawhorses, with each leg fitted with a swiveling caster. Atop these legs were installed tabletops consisting of 1 by 12-inch planking.

On top of these tables we made up eight, 8-foot fixtures. We used 3/8-inch rope tied to the 64-foot unit at ten suspension points and looped through the bar joists on the ceiling. With the ropes all tied together and the hangers installed previously, by pulling the rope with a jeep, we raised the units to the required height. All we then had to do was lock the collars on each fixture. Connecting each three such sections

(Continued on page 58)



Scaffold speeds installation over deep well

A unique 36-foot span of folding aluminum scaffold provided the solution to a tricky problem of installing a luminous ceiling over a 27-foot escalator well at the new Kaiser Center in Oakland. The scaffold, with supporting end frames on wheels, is an assembly of two vertical trusses enclosing a work platform, and takes ten minutes to erect. Two men can work safely from the platform, and trusses serve as guard rails.



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Season's Greetings

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Lighting

Code rules

Some lighting installations need fixtures approved for the location

By Walter R. Stone, Contributing Editor on Code Rules, Utica, N. Y.

◆ In specifying fixtures for lighting installations, consideration of types to be installed must not be based solely on the relative proficiencies of the available fixtures, but also on the Code provisions governing the types permitted or required in various locations.

For example, a particular fluorescent luminaire may indicate by its distribution graph that it would provide a more desirable light pattern where needed upon the face of a billboard than would be provided by a particular incandescent luminaire, and a less desirable one for outlining a large piece of sculpture. It is possible, however, that neither luminaire would be suitable or approved for use out of doors.

Although this may seem to be a rather obvious conclusion, it is by no means unusual to find instances where fixtures which were designed only for dry locations are specified for use out of doors. In fact, this is a very common complaint among inspection authorities.

Paragraph (a) of Section 410-4 of the Code requires that fixtures which are to be installed in damp or wet locations be approved for such locations. And Paragraph (b) of this section requires that fixtures be approved for corrosive locations when installed in areas having corrosive vapors or fumes.

Fixtures are required by Section 410-5 to be so constructed and installed that combustible material will not be subjected to temperatures exceeding 90 C (194 F). Fixtures and lampholders which are mounted over highly combustible material are required by Section

410-6 to be of the unswitched type. That is, there must be no switch integral with the socket.

If each fixture is not individually switched, however, by a wall switch or other switch which is not integral with the socket, then the fixture must be either mounted not less than eight feet above the floor or else so located or guarded that lamps cannot be readily removed or easily damaged.

Except for the chain-supported type, externally wired fixtures are prohibited by Section 410-7 from being mounted in show-windows. Fixtures in such locations which have sockets displaced from the main

fixture bodies are required, therefore, to have the wiring to the sockets enclosed within suitable stems.

Chain-type fixtures are required by Section 410-21 to use only stranded conductors. Flexible cords used in showwindows and showcases for plug-in devices are required by Section 400-6 to be of the hard service or junior hard service types except for temporary portable exhibition lighting and devices. (Type AFS heater cord is permitted also in windows but only for portable heaters.)

Paragraph (b) of Section 410-8 prohibits the use of pendant fixtures and lampholders in clothes closets. Paragraph (a) of this section requires that fixtures (other than pendants), when installed in clothes closets, be mounted over the door on the wall or on the ceiling. This is to prevent contact between the lamps and the clothing whether the latter is hanging from racks or placed upon shelving.

Occasionally, a lighting fixture falls from its mounting. In most cases, this is a result of poor workmanship. But it could result from incorrect or incomplete engineering specifications. Section 410-16 requires that fixtures be adequately supported. If connection of the fixture to the outlet box provides ade-

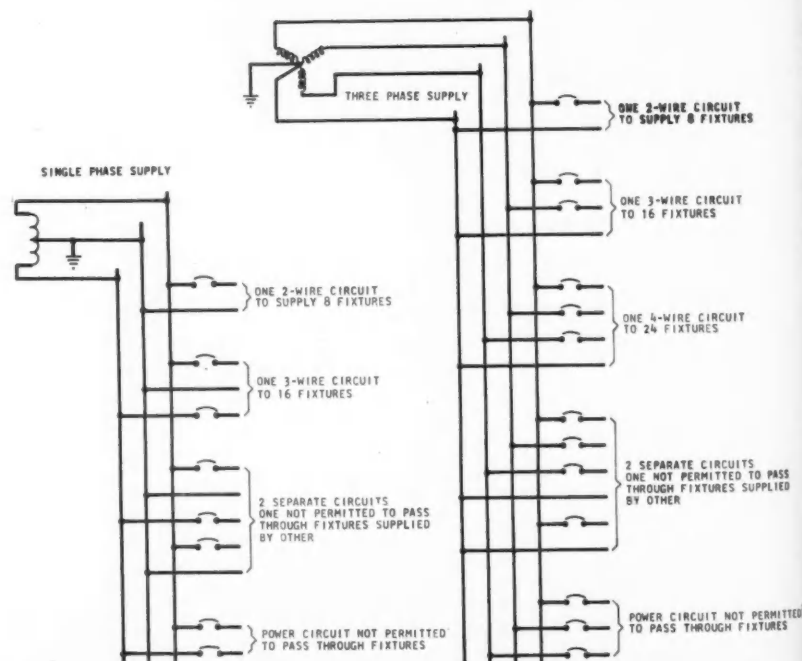


Fig. 1—Unless approved for the purpose fixtures are not permitted to be used as raceways for circuit wiring other than the circuit (including multi-wire circuit) supplying the fixtures through which they run. The above wiring diagram shows which circuits can pass through fixtures not otherwise approved for use as wiring raceways.

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quate support, this method may be used. Otherwise, fixtures must be supported independently of the box. Fixtures weighing more than 50 pounds are required by this section to be supported independently of the box.

Section 370-13(b) requires such independent fixture supports to be secured to studs, joists, or to other structural units of the building and states that, "... Lath of wood, metal or composition shall not be considered a structural unit." Wood supports for fixtures are required to be not less than $\frac{7}{8}$ of an inch in thickness.

Section 410-15 prohibits a fixture which weighs more than 6 pounds or which measures more than 16 inches in any dimension from being supported by the screw shell of a lampholder. Section 410-21 requires that fixtures and their associated conductors be so arranged that the weight of the fixtures does not put tension on the conductors.

Fixtures as raceways

In designing lighting installations, lighting engineers sometimes utilize fixtures as raceways for circuit wiring. This is in violation of Section 410-26 unless the fixtures themselves have been approved as raceways or unless only the circuits supplying the fixtures are run through them.

In other words, fixtures which are connected end to end or which are connected by approved wiring methods may be used as raceways for the circuit which supplies the fixtures, but not as raceways for any other circuit, such as a circuit supplying another group of fixtures, even if the other group is connected to them end to end. The circuit which supplies the fixtures and hence which may use the fixtures as a raceway may be a multi-wire circuit as well as a 2-wire circuit.

By a multi-wire circuit is meant not only a single-phase, 3-wire circuit using two phase conductors of opposite polarity and a common neutral, but also a three-phase, 4-wire circuit using three phase conductors of opposite polarity (or rather with polarities at 120 electrical degrees apart) and one common neutral.

But two or more phase wires of
(Continued on page 58)

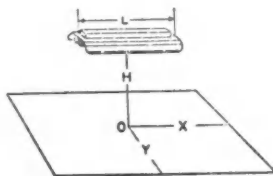


Hello again! Wait
'til you see what we at
Geringer have in store for
you in the months ahead. We've just finished
photographing our exciting new line of fixtures—
so look for them and me—in this space.

GERINGER
L I G H T I N G
GERINGER & SONS MFG. CORP.
Factory & Offices: Peekskill, New York

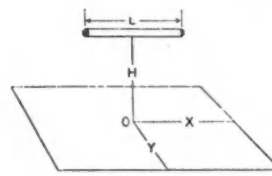
**ASK YOUR GERINGER REPRESENTATIVE
FOR YOUR SET OF GERINGER GALS**

Point-by-point footcandle data tabulations



Luminaire Lumens

4' Luminaire—4200 Lumens
6' Luminaire—6200 Lumens
8' Luminaire—8400 Lumens



Bare Lamp Lumens

4' Lamp—2800 Lumens
6' Lamp—4100 Lumens
8' Lamp—5600 Lumens

FOOTCANDLES FROM LUMINAIRES

L (Feet)	H (Feet)	Distance in "Y" Direction (Feet)				
		0	2	4	6	8
4	2	212	63	10	3	1
	4	73	46	19	8	3
	6	33	28	17	11	4
6	2	235	76	15	4	2
	4	91	61	28	11	5
	6	50	39	26	13	7
8	2	254	86	20	7	2
	4	106	73	31	13	7
	6	57	46	29	17	9

L (Feet)	H (Feet)	Distance in "X" Direction (Feet)				
		0	2	4	6	8
4	2	212	127	22	4	2
	4	73	53	23	11	9
	6	33	29	19	11	10
6	2	235	184	76	13	2
	4	91	79	40	17	11
	6	50	41	26	15	13
8	2	254	234	129	24	11
	4	106	96	64	29	12
	6	57	52	41	24	13

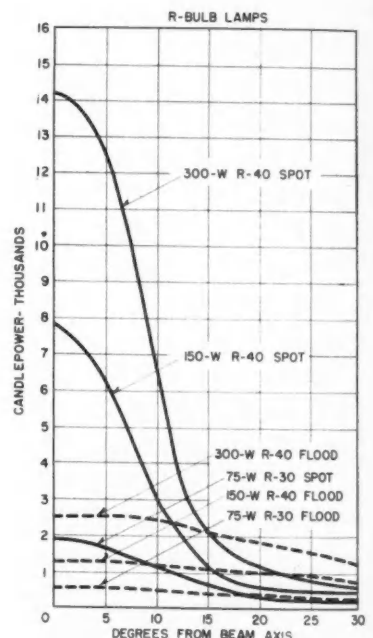
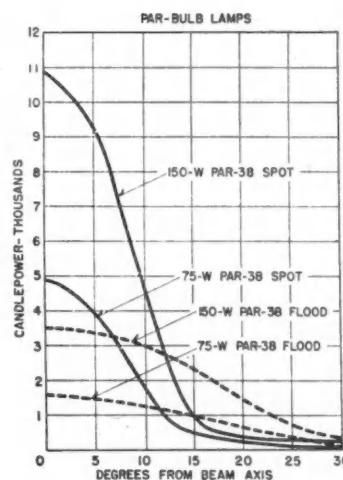
FOOTCANDLES FROM BARE LAMPS

L (Feet)	H (Feet)	Distance in "Y" Direction (Feet)				
		0	2	4	6	8
4	2	55	23	7	2	..
	4	19	13	7	3	..
	6	9	8	5	3	..
6	2	63	28	9	3	..
	4	25	18	10	6	..
	6	12	11	8	5	..
8	2	63	30	11	4	..
	4	27	21	12	6	..
	6	15	13	9	5	..

FOOTCANDLES

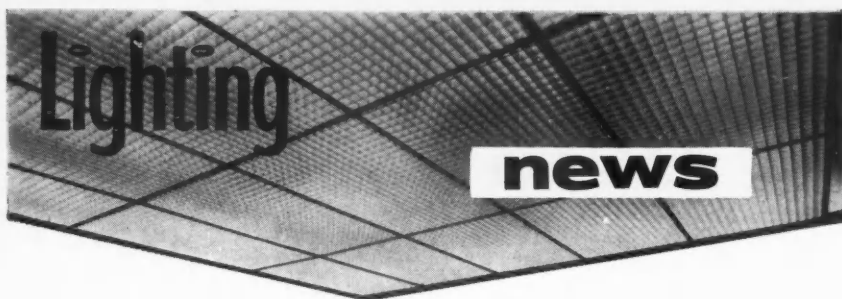
Mount- ing Height (Feet)	Distance from Center of Beam (Feet)				
	0	1	2	4	6
75-Watt PAR-38 Spot					
5	194	54	9	2	1
7½	86	48	8	1	1
10	49	37	13	1	1
15	22	19	12	2	1
75-Watt PAR-38 Flood					
5	60	46	17	2	1
7½	27	22	16	2	1
10	15	13	12	4	1
15	7	6	6	4	2
150-Watt PAR-38 Spot					
5	420	145	13	7	2
7½	190	118	17	4	3
10	105	87	34	3	2
15	47	43	29	4	1
150-Watt PAR-38 Flood					
5	138	107	37	4	1
7½	61	55	37	6	2
10	35	32	27	9	2
15	15	15	14	9	4
75-Watt R-30 Spot					
5	76	42	9	3	1
7½	34	25	9	2	1
10	19	17	8	2	1
15	8	8	5	2	1
75-Watt R-30 Flood					
5	16	15	11	2	1
7½	7	7	6	3	1
10	4	4	4	3	1
15	2	2	2	2	1
150-Watt R-40 Spot					
5	300	96	19	6	3
7½	130	75	23	6	3
10	75	56	25	5	2
15	33	30	17	5	2
150-Watt R-40 Flood					
5	51	44	30	8	2
7½	23	21	18	9	4
10	13	12	11	8	4
15	6	6	5	4	3

CANDLEPOWER DISTRIBUTION CURVES



Mount- ing Height (Feet)	Distance from Center of Beam (Feet)				
	0	1	2	4	6
300-Watt R-40 Spot					
5	560	196	35	13	4
7½	250	165	35	9	6
10	140	116	49	9	5
15	60	59	41	9	4
300-Watt R-40 Flood					
5	100	89	54	16	5
7½	45	40	32	17	7
10	25	23	21	14	8
15	11	11	10	8	6

The diagram and tabulation at top of page permits rapid calculation of footcandles under fluorescent fixtures or bare lamps. Figures are based on the lumen outputs indicated. A simple proportion may be used to determine the footcandle values for other luminaire or lamp outputs. The tabulation on lower half of page permits rapid determination of footcandle levels under R-40 and PAR-38 lamps. (Data courtesy Westinghouse Lamp Division.)



Con Edison has clinic on industrial lighting

OVER 600 GUESTS attended the recent Industrial Lighting Clinic and Conference sponsored by Consolidated Edison Company of New York. Architects, engineers, and plant managers heard about, and saw, the latest techniques in industrial lighting.

Featured as speakers were three top authorities on industrial lighting: E. A. Lindsay of General Electric Co., nationally known for his work in this field; Marshall N. Waterman, Westinghouse Electric Corp., a past president of the Illuminating Engineering Society; and George W. Clark, Sylvania's factory lighting expert.

Fourteen electrical manufacturing companies cooperated with Con Edison by presenting lighting demonstrations and manufacturers' displays and exhibits.

In his opening address, E. A. Lindsay noted the tremendous strides taken by industrial lighting in the last two to five years. "Much of the lighting accepted five to ten years ago is now obsolete," he said. He pointed out that one footcandle of light was in general use in industry in 1900. By

1950 50 footcandles was the average figure. Now, in 1960, 100 footcandles is the average accepted intensity of light.

"At the same time the cost of light has gone down," Mr. Lindsay continued. "In 1906, one footcandle cost about 7.7 per cent of the average worker's salary. Now, in 1960, 200 footcandles cost 3.4 per cent of the worker's wages."

Marshall Waterman followed up these remarks by describing the myriad of new and improved sources through which the public's increasing desire for better lighting is being satisfied. "The fastest growing element in the light source field is the color corrected mercury lamp," he stated.

George Clark listed eight factors in lighting design: illumination, brightness distribution, specular reflection, shadows, spectral distribution, psychological effect, aesthetic effect, and economics. He then went on to make the following predictions: (1) "Lighting equipment will lose its identity as being either commercial or industrial. The division will disappear." (2) "There will be more and more integration of lighting with environmental elements—sound, color, air conditioning, etc." (3) "We'll see much further investigation of the psychological impact of good visual conditions."

New Bradley showrooms open in San Francisco

BRADLEY Manufacturing Co., Chicago lamp manufacturer, has opened permanent showrooms in San Francisco in the Western Merchandise Mart. The new showroom will serve as headquarters for Irving Gabriel, Bradley's San Francisco sales representative.

Mr. Lou Kollisch, vice-president, made the announcement and stated that the firm's complete line of table and functional lamps will be displayed in the new Bradley showroom.

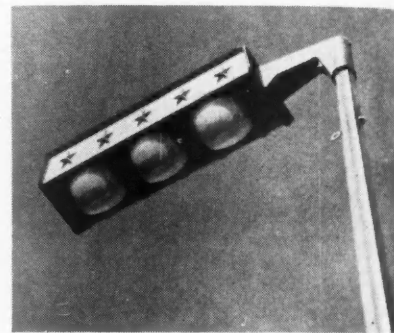
This is the third permanent showroom the firm has opened this year, in line with a continuing expansion program instituted in January.

According to Mr. Kollisch, Bradley plans to open additional permanent showrooms in other key cities in the near future.

'Walk of Fame' lights made by Westinghouse

THE WESTINGHOUSE lighting division has supplied Hollywood with unique, star-studded lighting fixtures, recently erected along the entertainment capital's new "Walk of Fame."

The new luminaires were designed and built by the Westinghouse lighting division in Cleveland, exclusively for this installation.



These luminaires were designed and manufactured by Westinghouse for the new Hollywood "Walk of Fame" honoring 1,200 entertainment names.

Five coral-colored stars line each side of the fixture. The sides and face of the housing are gray and the end panels and top are black.

Each unit contains three 700-watt deluxe "colortone" mercury lamps developed especially for this project by the Westinghouse lamp division in Bloomfield, N. J. To prevent color distortion and create light complementary to most complexions, a phosphor coating on the bulb and a special filter glass were used.

Each lamp has a life expectancy of 10,000 hours or about two and one-half years. The standards have outlets providing plug-ins for seasonal or premiere lighting without stringing special wiring from pole to pole.

The new lights, atop 32-foot electroliers, form a "canopy of stars" highlighting 15,000 feet of terrazzo sidewalk embellished with the names and symbols of 1,200 entertainment personalities of radio, television, recording, and motion picture fame.

The Hollywood Chamber of Commerce boasts that the 154 stellar standards make Hollywood Boulevard the world's brightest street. The light



Jack Gamolsky, sales technical representative for Con Edison, explains a demonstration on the effects of color of light to Richard Finn, of Plymouth County Electric Co., Mass.

level is about four times brighter than that on the Wilshire Boulevard Miracle Mile in Los Angeles, exceeding 10 footcandles, compared to the present 1.2 footcandles.

Third lighting show looms as major event

WITH "LIGHTING for Today and Tomorrow" as the over-all theme for the Third National Lighting Exposition, this industry-wide trade show which takes place in New York's Coliseum, March 5-8, 1961, looms as one of the major events in the lighting industry.

Not only will the industry be given the opportunity to display and to see the latest in lighting equipment but the world lighting forum, a series of nine panel symposiums planned by an honorary committee of lighting experts, should prove to be an educational program of invaluable aid to the entire industry.

These symposiums, which were planned by the committee not only for the manufacturer, the contractor, and the wholesaler, but for all the buying influences involved in every phase of this \$600,000,000 industry, will be held in an acoustically perfect auditorium, specifically created at the Coliseum for these discussions.

Each symposium will last 1½ hours and will enlist the services of the top lighting people both in America and abroad, extending its coverage for the first time to the international field.

Because of the tremendous demand already voiced for tickets to these symposiums, members of the lighting industry are being given an opportunity to register in advance for one or all of the nine symposiums so that the limited space can be reserved for a qualified audience.

Though there is no registration fee to attend the exposition, there will be a \$2.00 registration charge for each of the symposiums. However, if all nine are desired, the fee will be \$13.50 for the series. Tickets to the symposiums will also register the holder to attend the show itself.

Checks or money orders for symposium tickets are being accepted now by the National Lighting Exposition Headquarters, 477 Madison Ave., New York 22, N. Y. The same reserved seat will be held for the purchaser for whatever symposiums are designated.

The symposiums, which will thoroughly discuss such a vitally new topic in lighting as "The Integration of Lighting, Heating, and Air Conditioning" as well as explore the findings of international lighting experts, will also concentrate heavily on relighting



PHOENIX
LIGHTING FIXTURE CO., INC.

167 41st STREET, BROOKLYN 32, N. Y. STerling 8-5630

in all its phases, covering street and highway, residential, offices, factories, institutions, etc.

With over 80 per cent of exhibit space already sold, Harold R. Meyer, exposition president, is positive that this gigantic trade show and its educational forums will bring together people from all over the country to see, to listen, and to buy.

Attendance to the show itself is by invitation only, with all facets of the lighting industry and its allied fields represented. At least 200 manufacturers will present on display over 250 exhibits—many on view for the first time.

The exposition and forum will be sponsored by LLEMSA (Lighting, Lamps, and Electrical Manufacturers Salesman's Association, Inc.) as it has been for the previous two shows.

Gand, four others get Benjamin appointments

ROBERT GAND has been appointed director of merchandising for the Benjamin Division of Thomas Industries, Inc., Louisville, Ky.

The Benjamin Division, which manufactures commercial and industrial lighting fixtures, is located in Des Plaines, Ill.

The appointment of Mr. Gand and four other executives in the Benjamin



Robert Gand

merchandising department was announced by Otis Zumwalt, vice-president in charge of merchandising for Thomas.

The other new appointments include Robert Geocarlis and Fred Farley as merchandise managers of specific product lines. Ray Hurley as chief designer, and Donald Englebreetsen as merchandising assistant.

In his new position Mr. Gand will be responsible for all Benjamin product lines, and for new product development.

Mr. Gand joined Thomas Industries ten years ago as a St. Louis area sales representative in the Moe Light Division and later became district sales manager in the Chicago area. During that time he was membership chairman of the drive for reactivating the Chicago chapter of the Illuminating Engineering Society. He is a graduate of the University of Illinois.

As merchandising manager for the Benjamin division, Mr. Gand succeeds Michael N. Flynn, who recently was appointed sales manager for Benjamin.

Responsibilities for the four other appointments in the merchandising department are as follows:

Mr. Geocarlis becomes merchandise manager of the entire line of Benjamin recessed troffers and Mr. Farley is merchandise manager of the commercial fluorescent product lines.

Mr. Hurley, as chief designer, is responsible for new product design.

Mr. Englebreetsen, who will be merchandising assistant, will be in charge of production forecasting and other merchandising activities for all lines of equipment manufactured by the division.

IES regional meeting planned for April '61

THE 1961 SOUTHWESTERN regional conference of the Illuminating Engineering Society will be held April 16, 17, and 18, 1961, at the Skirvin Hotel in Oklahoma City, Okla.

Working on the conference are John Deck, regional vice-president; Paul Sheline, general chairman; and the following committee chairmen: Dale Hampton, program; W. S. Irving, entertainment and reception; Mrs. Lloyd

Boyles and Mrs. W. S. Irving, ladies; Roy Jackson, arrangements; Robert B. Gow, hotel; Blair Perkins, registration; and Lloyd Boyles, finance.

Tentative plans call for the regional activities meeting and president's reception on Sunday, April 16, with technical sessions held on Monday and Tuesday.

Westinghouse appoints Litten sales manager

THE APPOINTMENT of David L. Litten as sales manager of the Westinghouse Electric Corporation's lighting division in Cleveland has been announced by Bruce A. Everly, marketing manager.

A native of Fargo, N. D., Mr. Litten



David L. Litten

joined the Westinghouse graduate student training course in 1951 following his graduation from North Dakota State College where he received a degree in mechanical engineering.



Discussing IES southwest conference arrangements are, left to right, Dale Hampton, program chairman; Lloyd Boyles, finance chairman; Paul Sheline, general chairman; and W. S. Irving, entertainment chairman.

After two years in the Army and completion of his graduate student training, he was assigned to the Westinghouse lighting division as an application engineer.

New agency formed by Larry Strack

A new manufacturers' agency specializing in residential lighting fixtures, Strack Associates, has been organized by Larry Strack, for the past six years factory representative for Globe Lighting Products of New York.



Larry Strack

With headquarters at 85 Wyndham Drive, N.W., Atlanta 19, Ga., the agency will handle only lines in the residential and decorative commercial fields.

Lines carried by the agency are Globe Lighting; Phoenix Lighting of New York; Bibi and Company of New York; Becker Manufacturing Company of Rosemeade, Calif.; and Active Specialty Corporation of Walden, N. Y.

The agency will cover Georgia, Alabama, and Tennessee.

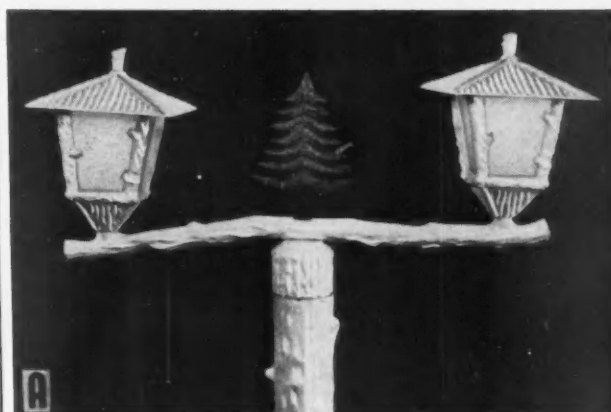
Promotions help sales for Superior Electric

A \$200,000 CARAVAN of light is one of eight promotions the Superior Electric Co., Bristol, Conn., is making available to electrical wholesalers to help them sell good home, office, and industrial lighting—with Luxtrol light controls.

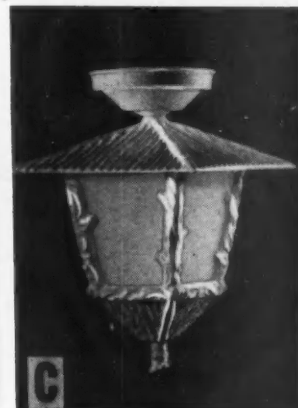
The caravan consists of a custom-built highway coach and a specially designed house trailer. It has visited nearly every state, made hundreds of showings under the sponsorship of electric utility companies and Luxtrol distributors, and has been seen by hundreds of thousands.

Electrical wholesalers tie-in with this promotion by inviting architects,

All Cast Aluminum • Rust Resistant • Ideal for Outdoor



hand casted
Frank Dini Imports
aluminum products



Decorating begins at your Front Door

A-#189 Twin lite with attractive Pine Tree 28" in width and 14" in height.

B-#93 Matching wall bracket. Strikingly finished in Italia White, Satin Black or Swedish.

C-#91 Matching ceiling piece. Ideal for porches, patios, basements and recreation rooms.

Write for our new Miniature Catalog

FRANK DINI CO
ROUTE 17, LODI, N. J.
HUBBARD 7-6305

builders, and electric contractors to attend either special showings or the public showings which are usually held at shopping centers.

Other promotions of Superior are a sound motion picture, sound slide film, women's club program, booklet, promotional program for home builders, advertising aids, and a series of mailings.

La Vigne new manager of Lighting Dynamics

PAUL LA VIGNE has been appointed general manager of Lighting Dynamics, division of the John C. Virden Co., according to John C. Virden, Jr., president of Virden.

Mr. La Vigne will be responsible for marketing, sales, and manufacturing of Lighting Dynamics commercial



Paul La Vigne

and industrial lighting fixtures nationally, as well as direction of sales of all Virden residential lighting in the West.

He was formerly acoustical engineering manager of Fiberglas Engineering and Supply, division of Owens-Corning Fiberglas. Earlier he was a partner in Smyth & La Vigne, Inc., acoustical engineers and contractors.

Lighting Dynamics is headquartered in El Monte, Calif.

Electrical exposition to take place in April

THE IOWA-ILLINOIS Industrial Electrical Exposition will be held April 4, 5, and 6, 1961, at the Blackhawk Hotel, Davenport, Iowa, according to an announcement by J. Everett Christiansen, managing director of the show.

Leading manufacturers of electrical equipment and lighting fixtures in the commercial and industrial fields are

being invited to display their products to a "selected and specially invited group of architects, consulting engineers, contractors, educators, builders, government and municipal officials, and maintenance heads and purchasing agents of the principal industrial and commercial establishments in the Quad City area," Mr. Christiansen stated, "with attendance by invitation only, extended to interested persons and firms within a 100-mile radius."

With more than 10,000 square feet of exhibit area on one level, approximately 80 booths are available.

GE appoints LeVieux promotion specialist

LARRY J. LEVIEUX has been appointed advertising and sales promotion specialist at General Electric's ballast department, Danville, Ill., according to C. Gus Grant, the department's manager of marketing.

In his new position Mr. LeVieux is responsible for coordinating all advertising and sales promotion activities for the department's full line of indoor and outdoor fluorescent lamp ballasts.

A native of Okemah, Okla., Mr. LeVieux graduated from the University of Oklahoma in 1955 with a BA degree in journalism, and joined General Electric as a public relations science-show lecturer.

Daybrite names two to sales positions

CARL L. POWELL, western division general manager of Day-Brite Lighting, Inc., has announced two new appointments in the firm's western sales operation.

Effective immediately, James C. Ramsey is Day-Brite's Western regional sales manager. He will be di-



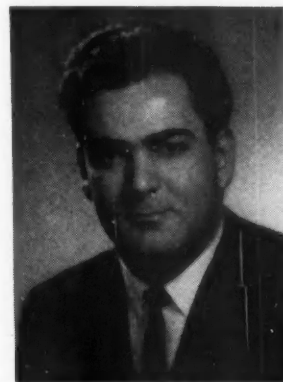
James C. Ramsey

rectly responsible for the western region's field sales personnel, which now includes 16 representatives. Prior to this assignment he was a Day-Brite representative in San Jose, Calif. His office will now be located at Day-Brite's plant in Santa Clara.

Leon P. O'Neill has joined the staff of Brundage Lighting Associates, Day-Brite's San Francisco representatives. He will cover the San Jose area recently vacated by Mr. Ramsey. Formerly he was customer service manager at Day-Brite's Santa Clara plant.

Mersick names LaGiusa as new sales manager

FRANK L. LAGIUSA has been appointed sales manager of the commercial lighting department of the C. S. Mersick Electric Supply Corp., New Haven, Conn. Mr. LaGiusa was formerly employed as a sales engineer and a designer for Lightolier, Inc., in New York City, where he helped to develop standard and custom commercial lighting fixtures.



Frank F. LaGiusa

Mr. LaGiusa served in the Navy during World War II, attended New York University and Pratt Institute in New York, and in 1955 received a B.S. degree in engineering from the University of Bridgeport.

Phoenix Glass Company modernizes facilities

PHOENIX GLASS CO., Monaca, Pa., has announced a relocation and modernization of certain production facilities. Progress has been made in the demolition of a large group of old buildings that are rapidly being replaced with a new two-story steel combination building. This modernization work will consolidate decorating and warehousing, as well as improve shipping facilities.

Lighting products

Miller wall light

A new fluorescent fixture adapted to a wide variety of special wall mounting lighting applications is available from the Miller Co., Meriden, Conn. Because it makes use of two lighting components, up and down, either independently or jointly, depending upon the lighting needs of the location where it is mounted, the new fixture is called the Miller multi-purpose wall light.

The unit makes three distinct types of lighting available from a single unit. When both downward and upward components are used, a desirable balance of comfortable general illumination with direct reading or work light is obtained. Up light only provides general room lighting that



will be comfortable even to bedfast patients looking up at the ceiling. Down light only permits reading, working, etc., without lighting up an entire room.

This choice of lighting arrangements makes the light ideal for lighting hospital beds, wash rooms and

bath rooms, motel rooms, apparel fitting rooms, private offices, recreation rooms, home study areas, indoor signs, stairwells, entryways, etc.

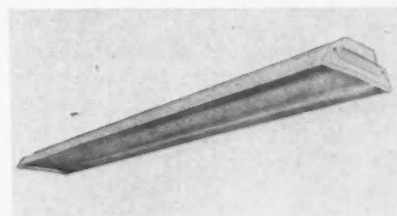
The fixture is made in two-, three-, and four-foot lengths.

Write No. P-1201 on coupon, pg. 45

Day-Brite commercial unit

Day-Brite Lighting, Inc., 6260 N. Broadway, St. Louis 15, Mo., has announced the Fairview-IV, a new four-lamp wide commercial unit, with one-piece Cleartex enclosure. The new unit is light in weight and designed for easy installation.

Measuring only 14 inches in width, Fairview-IV avoids the bulky look of most four-lamp fixtures. Four-foot units accommodate four Rapid-Start lamps and can also be obtained for



DESIGNED FOR A BIGGER SELLING EDGE...

METALLIC *Silvatrim*® PLASTIC FIXTURETRIM WITH THE NEW "LOK-CLIP"

Economical **SILVATRIM**® is available in brass, copper, chrome, gold or any other metallic finish. Actually pays for itself in production savings alone. Easy to apply with the new, inner retaining "Lok-Clip" that assures a permanent closure. Highly flexible **SILVATRIM**® practically shapes itself. It form-fits around spun metals, spun glass, perforated metals... practically anything at all. Does away with expensive metal formings and complicated assemblies. **SILVATRIM**® will never tarnish or lose its lifetime metallic lustre. Many stock shapes on hand for immediate delivery. Write for samples and instructions on how easily **SILVATRIM**® and the new "Lok-Clip" can be applied.

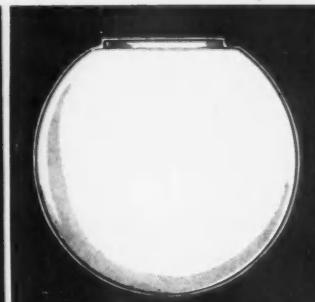
GLASS LABORATORIES, INC., 863-65th Street, Brooklyn 20, N. Y. Dept. L12

BLOWN OPAL GLASS COMMERCIAL UNITS



OPAL BALL (WITH FITTER NECK)

Cata. No.	Ball Size	Fitter	Cin. Pcs.	Wt. Lbs.
4500	5"	3 1/4"	12	10
4501	6"	3 1/4"	12	12
4502	7"	3 1/4"	24	42
4504	8"	4"	12	20
4506	10"	4"	12	27
4507	10"	6"	12	27
4508	12"	4"	4	17
4509	12"	6"	4	17
4510	14"	6"	4	21
4511	14"	8"	4	21
4512	14"	7"	4	21
4513	16"	6"	2	28
4514	16"	8"	2	28



NECKLESS OPAL BALL

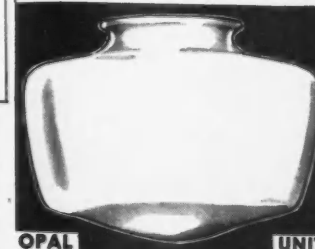
Cata. No.	Ball Size	Opening	Cin. Pcs.	Wt. Lbs.
4516	6"	4"	36	35
4518	8"	4"	12	20
4520	10"	4"	12	27
4521	12"	5 1/4"	4	17
4522	14"	5 1/4"	4	21
4523	16"	5 1/4"	2	28



BATH ROOM GLASS
No. 4538
Opal Glass
Fitter 2 1/4"



BELL TYPE
blown opal glass
No. 4540 — 6" Diam.
2 1/4" Fitter
Packed 36 Wt. 23 lbs.
Price .60
No. 4541 — 7" Diam.
2 1/4" Fitter
Packed 24 Wt. 18 lbs.



OPAL UNIT

Cata. No.	Diam.	Fitter	Cin. Pcs.	Wt. Lbs.
4526	7"	4"	24	23
4528	9"	4"	12	18
4529	10"	4"	12	31
4530	10"	6"	12	31
4531	12"	4"	12	32
4532	12"	6"	12	32
4533	14"	6"	4	16
4534	16"	6"	4	23
4535	18"	6"	2	15

ANGELO BROS. CO. 2333 N. MASCHER ST. PHILA. 33, PA.

two or three Rapid-Start lamps. The eight-foot Fairview-IV is available in tandem Rapid-Start or eight-foot Slim-line, two, three or four lamps wide.

The surface-mounted Fairview-IV measures 4 $\frac{3}{8}$ inches deep. Translucent white plastic side panels provide soft ceiling illumination. The Day-Brite Cleartex bottom panel offers prismatic control for low-brightness lighting.

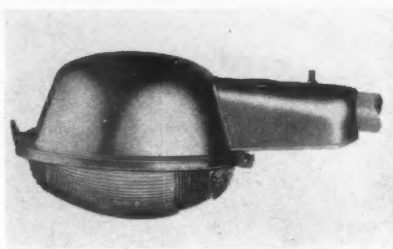
Write No. P-1202 on coupon, pg. 45

Revere street luminaire

Revere Electric Manufacturing Co., 7420 Lehigh Ave., Chicago 48, Ill., announces the new 2500 series "Urbanoval" end-mounting street lighting luminaire for residential areas or secondary streets where uniform, low-level lighting is desired.

The Urbanoval is designed for 100-, 175-, or 250-watt mercury lamps or incandescent lamps up to 4,000 lumens. It is the latest addition to a new family of Revere luminaires engineered to meet the varied requirements of different street lighting applications.

The smallest in the Revere family of end-mounted oval mercury lumi-



naires, the Urbanoval provides efficient, low cost lighting. A choice of two Revere-Corning Pyrex refractors provides A.S.A.-I.E.S. Type II or Type II—four-way distribution patterns with clear lamps, or Type III or four-way distribution with phosphor-coated mercury lamps.

Write No. P-1203 on coupon, pg. 45

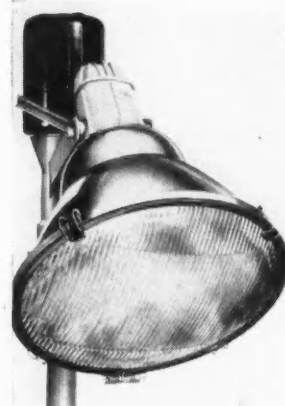
Spreadliter floodlights

Wide horizontal spread, the economies of mercury vapor lighting, and the high efficiency of parabolic reflectors are combined in relatively low initial cost Spreadliter floodlights introduced by the Steber Division of The Pyle-National Company, 1334 North Kostner Ave., Chicago 51, Ill.

Spreadliter features include uniform

distribution without hot spots, full 18-inch parabolic Anadol-finished aluminum reflectors which avoid trapped light, fin-cooled aluminum socket housing for greater efficiency, simple installation with universal adjustment, easy servicing requiring no tools for cleaning and lamp changing, and sturdy construction of low overall weight.

Combination pole-top floodlights with ballast are available as a complete package. Spreadlites for remote ballast mounting are also available in wall, crossarm, pipe clamp, and pole-top types.

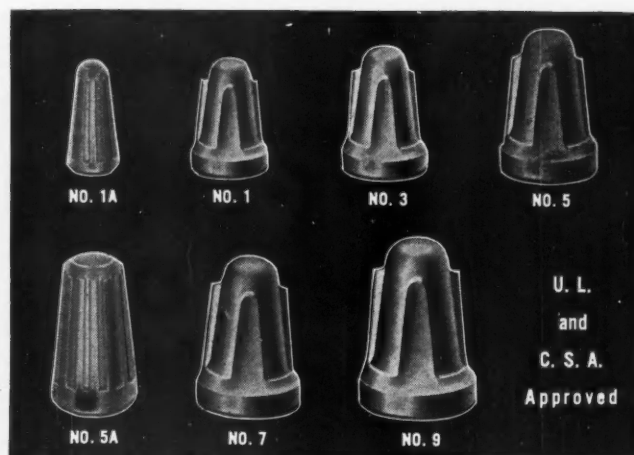


Season's Greetings

Once again it is our pleasure to extend best wishes to our many friends and to hope that each and every one has a Merry Christmas and a Happy New Year.

**LIGHTING, LAMP & ELECTRICAL
MFGRS. SALESMAN'S ASSN., INC.**

**Prince George Hotel
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Durable Ceramic Wire Connectors a size and type for every use

- Cost Less!
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SPRING SALES CO.
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WEINGART & LUSTIG
1567 East 25th St.
Los Angeles 11, Calif.

ASSOCIATED AGENCIES, INC.
226 Ruggles St.
Boston, 20, Mass.

SPIES-HANCOCK & ASSC.
5523 Dyer St.
Dallas, 6, Texas

J. P. SUTTON & SON, INC.
3919 Wesley Terrace
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CENTRAL PORCELAIN COMPANY
503 RAILROAD STREET - COLUMBIANA, OHIO

All types are especially adapted to parking lots, drive-ins, filling stations, athletic fields, railroad yards, loading docks, construction areas, excavations, amusement centers, playgrounds, and architectural accent lighting.

Write No. P-1204 on coupon, pg. 45

Eagle outlet winker

Although attractively re-designed and molded in red bakelite, the Eagle outlet winker still retains all the engineering features gained from 30 years experience by Eagle Electric



Manufacturing Co., Inc., 23-10 Bridge Plaza South, Long Island City, N. Y.

The Eagle winker, catalog No. 471, is designed for signs, Christmas lights, etc., and provides 14 to 16 flashes per minute. The winker mechanism is completely enclosed, with no unsightly washers. Its new design permits a standard duplex receptacle to accommodate two winkers.

Engineered with watch-like precision, the No. 471 winker incorporates these features: a longer and wider bi-metallic element to flex more easily and without damage; a larger, wider element to accommodate enough wire to prevent overheating of coil; winding on specially developed machines to lay down wire evenly and without bunching; and wide, pure, silver contact points that will not pit easily.

Write No. P-1205 on coupon, pg. 45

Sola mercury transformer

A new 400-watt two-lamp parallel mercury transformer by Sola Electric Co., Busse Road at Lunt, Elk Grove, Ill., features a new constant wattage circuit which provides electrical independence between the lamps.



Each lamp is provided with its own series capacitor, and interaction between lamps is negligible. Thus failure of one lamp will not significantly affect the operation or light output of the remaining lamp.

Starting voltage assures positive starting of H-1 type lamps down to -20 degrees F. Crest factor is within the lamp manufacturers' recommendations. Regulation is good, efficiency is over 90 per cent, and the power factor is high.

Offered in a corrosion-resistant alu-

Wanted: Manuscripts

The editors of **Lighting** will welcome contributions from the field for publication. Electrical contractors, lighting consultants, electric utility lighting engineers, and others closely associated with the lighting industry are invited to submit articles, photographs, and drawings relating to important lighting installations and developments anywhere in the United States. All articles will be given careful consideration and payment will be made promptly for all material accepted for publication. Write for your copy of **Lighting's "Author's Guide."**

Address all communications to

Editor, Lighting Magazine
806 Peachtree St., NE, Atlanta 8, Ga.

1960 LIGHTING DIRECTORY

Copies of this valuable directory of the lighting industry containing more than 15,000 listings in 500 categories are still available from the publishers at \$5.00 per copy. In addition to the buyers' guide section, listing the names of manufacturers of more than 500 different types of lighting fixtures and accessories, this 1960 issue contains the all-new manufacturers' representatives' section, which will enable lighting men to locate a manufacturer's nearest representative. Send orders to

Lighting Directory

806 Peachtree St., NE, Atlanta 8, Ga.

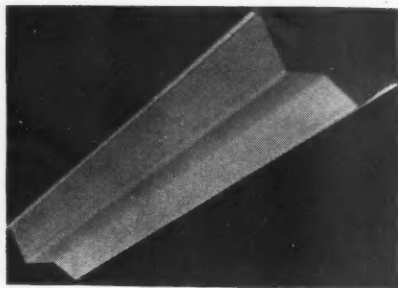
minum weather-proof case, the new transformer measures 6 $\frac{1}{8}$ " x 12" and weighs 47 pounds. It is available in primary voltages of 100-130v or 200-260v, 180-235v, 240-315v, and 200-260 x 400-520v.

Write No. P-1206 on coupon, pg. 45

Modern fluorescent fixture

A distinctive new fluorescent fixture devised to fill the need for an ultra-low profile unit is made by Modern Light Company of St. Louis, 7809 Maplewood Industrial Ct., St. Louis 17, Mo. This fixture, with a one-piece polystyrene diffuser and mounting two 40-watt Rapid-Start lamps, provides economical glareless illumination.

Seamless fully sealed construction eliminates collection of dust and dirt,



thus minimizing light loss. The diffuser is hinged from either side without the aid of tools, providing easy accessibility for installation or maintenance.

Welded construction and high quality baked white enamel finish assure a long serviceable life.

The overall size of only 3 $\frac{1}{2}$ inches deep by 12 inches wide by 4 feet long has compactness and a recessed appearance.

Write No. P-1207 on coupon, pg. 45

Sheffield styrene sheet

Development of a medium impact styrene sheet for lighting applications which is self-extinguishing when ignited has been announced by Sheffield Plastics, Inc., Sheffield, Mass.

Designated as Frost-White-Se, it is suitable for use in all-plastic ceiling installations—an application presently restricted almost exclusively to vinyl pans and sheet.

The result of a two-year development program, the new styrene sheet not only passes the New York City Building Code for self-extinguishing plastics, but also possesses superior color stability and light transmission characteristics.

Break resistance of Frost-White-Se sheet is said to be comparable to vinyl

and better than acrylic. Hence breakage in handling and shipping is minimized. More important, large sections of the new sheet can be bent or twisted during installation without shattering.

The new styrene sheet is color-stable up to 50,000 lighting hours—the equivalent of more than ten years of normal use. In this respect its performance approaches that of acrylic sheet, according to the firm.

Its excellent light transmission characteristics permit it to be used in thicker sheets, thus giving it greater rigidity and making it easier to handle than the thinner sheets.

To demonstrate the self-extinguishing characteristic of the Frost-White-Se sheet, sample strips 12 inches long were held in a vertical position and ignited at the lower end, as required by ASTM, test method D-568-56T. The flame went out before consuming two inches of the samples—well under the eight inches permitted by the test, according to Sheffield engineers.

The material also passes the requirements of the NYC code, Group A, as well as the Group 2 test of the Underwriters' Test Laboratory.

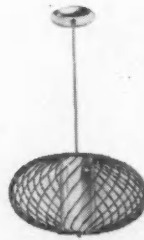
The Frost-White-Se styrene sheet is now in volume production at the Sheffield Plastics plant, Sheffield, Mass. It is priced slightly higher than the firm's regular light-stable, impact-resistant styrene sheet.

Write No. P-1208 on coupon, pg. 45

Moe Light chandeliers

A study in contrasts is offered by two new designs in chandeliers—traditional and modern—manufactured by Moe Light Division of Thomas Industries, Inc., 207 E. Broadway, Louisville 2, Ky.

The traditional chandelier (M-1587) is faithful to original "classic" lines and features, including lustrous opal shades, molded glass fonts of cranberry color, and polished brass detailing of spindle, arms, and finials. The spread is 24 inches; the 37-inch length can be shortened by removing links in chain. The finish is polished brass. Up to five 60-watt bulbs are recommended.



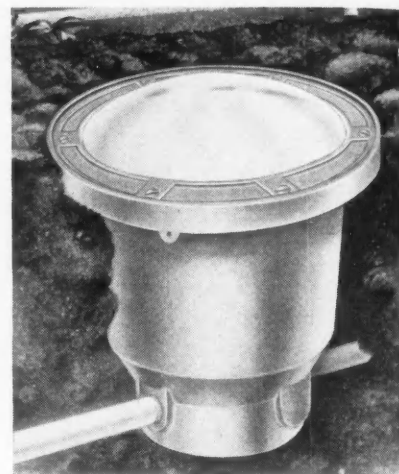
A departure from conventional styles, the modern design fixture (M-1462) features a cage of spiraling brass bars which houses hand-blown optic opal glass in the center. The diameter is 18 $\frac{1}{2}$ inches, the height 10 $\frac{1}{2}$ inches, and the length adjustable to 72 inches. One 100-watt bulb is recommended.

Write No. P-1209 on coupon, pg. 45

Weather-proof fixture

Prescolite Manufacturing Corp., 2229 Fourth St., Berkeley, Calif., has a new weather-proof fixture for flush installation in earth, concrete, or plaster, designed for outdoor installation in gardens, around commercial buildings, etc.

All-cast aluminum construction assures maximum corrosion resistance, and the unit is fully sealed to meet all



weather and grade conditions. The fixture is designed for a 150-watt par 38 flood or spot lamp, sealed beneath a clear-crystal tempered lens. Internal adjustment permits aiming of the lamp in any direction up to 30 degrees off the vertical.

The standard unit measures 9 x 9 inches and is tapped for $\frac{1}{2}$ -inch conduit side entry.

Write No. P-1210 on coupon, pg. 45

Sunbeam hospital system

Sunbeam Lighting Company of 777 E. 14th Place, Los Angeles, Calif., and Gary, Ind. has introduced another innovation in hospital bedroom service equipment.

It is the Centron-10 system, adaptable for mounting directly to the surface of any type of wall construction. This system incorporates a shallow surface-mounted central console and a prefabricated service leads enclosure which consolidate into one unified

"package" up to ten different lighting and service requirements.

All electrical conduits, oxygen and vacuum piping, and other service leads can be external to the wall, permitting this system to be installed without disturbing existing walls.

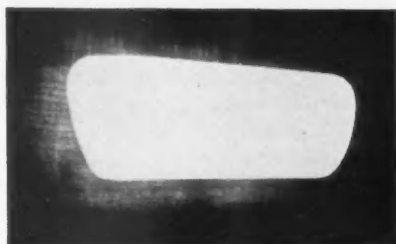
The consolidation of these vital patient services eliminates the effect of cluttered walls heretofore the result of individual installation of each service. Centron-10 surface mounted helps modernize any hospital bedroom interior with minimum "down" time and minimum loss of room occupancy revenue. This permits turning savings from remodeling costs into added services. In fact, one of the important advantages of surface-mounted Centron-10 is that future changes can be made without breaking into the walls.

Write No. P-1211 on coupon, pg. 45

Prescolite wall fixture

Prescolite Manufacturing Corp., 2229 Fourth St., Berkeley, Calif., has a new wall fixture designed primarily as a mirror light in bedrooms and bathrooms.

The fixture is rated for two 100-watt bulbs, can be mounted vertically



or horizontally to any standard electrical outlet box, and measures 6" x 17 3/4" x 5" deep.

Its contemporary glass is hand-blown in satin-finished Thermopal, assuring uniform light distribution without hot spots. An engineering departure on the glass mounting principle has been made, and the glass is hinged so that it can be swung easily away for cleaning or relamping, still held securely to the rest of the fixture while these maintenance operations are taking place.

Write No. P-1212 on coupon, pg. 45

Keystone Viking luminaire

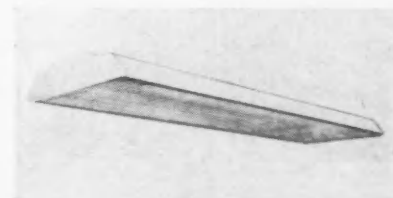
Shortly to be marketed by the Keystone Electric Manufacturing Co. is the new Viking luminaire with its

"Opti-View" bottom prismatic diffuser. The shielding's side panels are of clear opal and are secured to the prismatic section by an exclusive interlocking design which gives added strength to the whole assembly.

The new lens directs optimum light to working levels, while at the same time its precisely regulated brightness brings a greater measure of comfortable illumination.

Only 3 3/4" deep, the unit's inward sloping side panels allow over-all ceiling illumination. Functional continuous row bands eliminate the cost of end plates and speed up installation. Their use also permits interflow of light between units, minimizing contrasts.

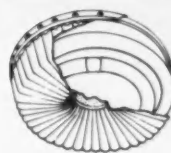
Mounting and maintenance costs are reduced, it is stated, since the completely enclosed shielding makes it largely proof against dust and insects,



1960 LIGHTING DIRECTORY

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Lighting Directory
806 Peachtree St., NE, Atlanta 8, Ga.



Beautifully styled for residential or commercial interiors the striking ribbed polystyrene shield provides an abundance of glare-free, diffused light . . . cleverly disguised airvents provide adequate ventilation for cool, comfortable operation.

Sterling
INDUSTRIES

5697 Rising Sun Avenue
Philadelphia 20, Pa.

requiring less frequent cleaning. Snap-on covers are quickly installed because they need no screws or fasteners.

The Viking will be available in two-lamp, four-foot rapid start or eight-foot tandem and eight-foot slimline.

Write No. P-1213 on coupon, pg. 45

Moe Light outdoor lantern

Moe Light Division of Thomas Industries, Inc., 207 East Broadway, Louisville 2, Ky., has a traditional design sentinel for the modern house, lantern M-1823-8. Equipped with a "Magic Eye" post (M-923), it turns on automatically at sunset, off at sunrise.

It has crystal-clear beveled glass panels trimmed in solid brass. One



150-watt bulb is recommended. It is available in four finishes: polished solid brass, weathered solid brass, black on solid brass, and white on solid brass.

The "Magic Eye" can also be purchased separately as a wall bracket control (M-930), to turn on or off automatically up to 200 watts. It features a hermetically sealed photoelectric cell in a weather-tight enclosure.

Write No. P-1214 on coupon, pg. 45

Wax-like electric candle

A new electric candle that has the appearance and feel of wax is now being marketed by North American Electric Lamp Co., 1520 North 13th St., St. Louis 6, Mo.

The soft, candle-like glow of this new lamp comes from a 1/4-watt neon bulb imbedded in the flame-shaped polyethylene tip. The candle body, as well as the tip, is of this wax-like plastic. The electric candle is available with both 1/4-inch high and two-inch high candle body. The two-inch



candle comes with or without realistic "drips" running down the side.

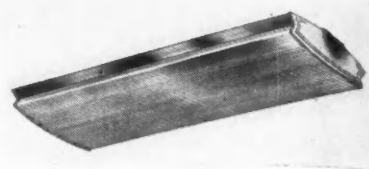
This innovation in decorative lighting is made with either medium screw or candelabra base, and will fit a variety of fixtures.

According to the manufacturer, the burning life of this electric candle is about 2,000 hours.

Write No. P-1215 on coupon, pg. 45

Mitchell wraparound fixture

Mitchell Lighting Division, Compco Corp., 1800 N. Spaulding Ave., Chicago 47, Ill., is manufacturing a new wraparound luminaire which is fully enclosed and shielded by an especially developed refractor-diffusor lens.



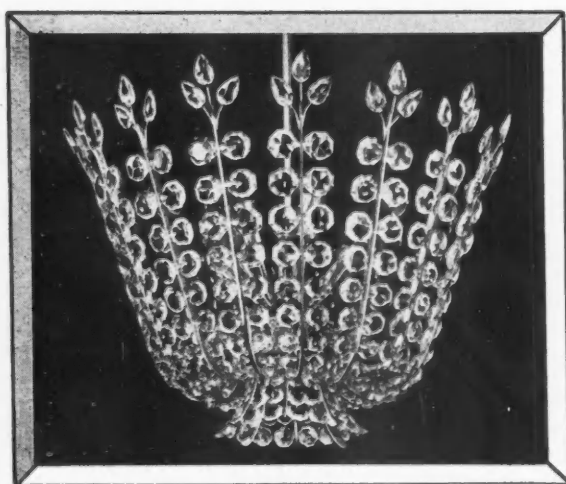
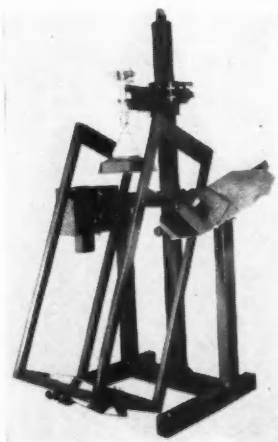
The luminaire is very shallow with an apparent depth of 2 1/8 inches when viewed from the side. The refractor-diffusor lens is designed to distribute 88 per cent of the light to the working plane and 12 per cent of the light to the side walls and ceiling.

The luminaire channel is grooved to accommodate sliding clamp type hangers. It is recommended for use in schools, offices, and stores, where high illumination levels are desired with a low brightness luminaire.

Write No. P-1216 on coupon, pg. 45

L. A. B. photometer

A new distribution photometer which accurately redirects light rays from various points around lamps and light fixtures to photoelectric measuring instruments has been developed by L. A. B. Corp., 700 Onondaga St., Skaneateles, N. Y. The simplified con-



new, authentic and original...

Contemporary Lighting

... a masterful collection of modern chandeliers, combining the luxury of hand-cut crystal and the simplicity of lustrous solid brass. New designs, meticulously crafted by skilled artisans... to enhance entrance foyers, dining and reception areas in homes, hotels, restaurants and smart shops. Exclusive with Sunbeam... America's only crystal house specializing in multi-color jeweled chandeliers. Write for Design Book III.

Sunbeam 3802: Exciting new approach to opulent lighting. Diamond-matched crystal jewels in amethyst and pure white... graduated in scale, set in solid brass. Diam.: 21" ... Body Ht.: 19" ... 9 60W lamps, and 1 downlight.

Franchise territories available for top-caliber sales representatives, and for lighting showrooms qualified to sell this superb collection.



Sunbeam Lightingwares, Inc.

92-35 166th Street / Jamaica 33 NY / REpublic 9-2020

struction and operation of this machine provides manufacturers of lighting equipment with a relatively easy and low cost method of obtaining light distribution curves.

The L. A. B. photometer represents a new concept in this type of equipment in that it permits both light source and photometric axis to remain in fixed positions. The test light fixture is mounted on an adjustable spindle and light rays from various points around the lamp are redirected by mirrors to photoelectric measuring instruments in a remote location.

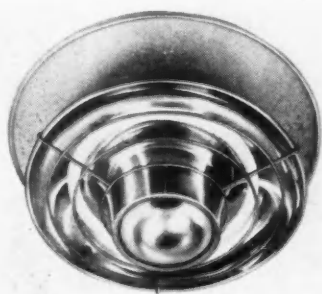
The fixture mounting spindle is vertically adjustable up to three feet for exact location of varying sized lamps at the horizontal axis of mirror rotation. The entire assembly is counter-balanced with weights for easy movement. During the test cycle, the light fixture is rotated at a uniform rate of 40 rpm by means of a timing belt drive to permit accurate measurement of light intensity at every point around the 360 degree scope of the lamp. Lighting fixtures up to 24 inches diameter and 50 pounds may be tested on this unit.

Write No. P-1217 on coupon, pg. 45

Heater-lighting fixture

Infrared Corporation of America, Westbury, Long Island, N. Y., is offering its surface mounted "Quartz-heat" circular infrared heater-lighting fixture combination.

It brings to the outdoor-indoor heating field an efficient infrared heating unit, with the added feature of incandescent light built in. Producing direct penetrating warmth like the sun



—the surface mounted 800-watt, 120-volt Quartzheat reaches top temperature within one minute.

To achieve maximum radiation, it features a high quality reflector finely plated with 24kt gold. This costly plating process results in reflection of 40 per cent more heat than polished aluminum and a surface effectively resistant to weather and atmospheric damage.

Write No. P-1218 on coupon, pg. 45



K-S-H Plastics, Inc., High Ridge, Mo., announces a new lighting engineering aid in the form of a durable, handy panel area calculator. The calculator is of specific help to architects and engineers in quickly and accurately determining the lens panel square footage necessary for any lighting job. The calculator is part of the K-S-H complete catalog and aids package for the lighting industry.

Write No. B-1219 on coupon, pg. 45

Luminous Ceilings, Inc., Dept. S-61, 3701 N. Ravenswood Ave., Chicago 13, Ill., has recently released an eight-page brochure listing a wide variety of light diffusing panels and specifications applicable to any ceiling lighting system. This colorful, 1961 brochure features a unique luminous ceilings characteristic chart which is a handy reference guide for architect, engineer, or contractor

figuring the use and approximate installation costs of luminous ceilings.

Write No. B-1220 on coupon, pg. 45

Gill Glass and Fixture Co., Inc., Philadelphia 34, Pa., has just issued an illustrated 20-page catalog, "Gallery of Lighting Inspirations," featuring an exclusive handcrafted collection of lighting fixtures inspired by the great masters of world famous works of art.

Write No. B-1221 on coupon, pg. 45

K-S-H Plastic, Inc., High Ridge, Mo., has available a comprehensive plastics lighting catalog specially designed for use by architects, engineers, and lighting specialists. The complete catalog is contained in a handy, durable binder for easy filing and reference use. The catalog material has been logically assembled to assure its use as a functional tool.

Write No. B-1222 on coupon, pg. 45

Always Select The EXECUTIVE INN



Indianapolis, Ind.

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100 ultra-modern, luxurious rooms in downtown. Beautiful Mayfair Dining Room, Jubilee Cocktail Lounge. TV and Telephones in all rooms. American Express and Carte Blanche Credit Cards honored.

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Drake Motel
North Plaza Motel
Town Center Motel
CALUMET CITY, ILL.
Town & Country Motel

DAYTON, O.
Gateway Motel
Drake Motel
Terrace Motel

NORFOLK, VA.
Admiralty Motor Hotel * (Opens Soon)

DALLAS, TEX.
Executive Inn*
TUCSON, ARIZONA
Executive Inn*
ALBUQUERQUE, N.M.
Executive Inn*

* For information — Write: Executive Inn, 401 E. Washington, Indianapolis, Indiana.

The Ruby Co., 129 West 27th St., New York, creators and manufacturers of fine lamps, chandeliers, and lighting fixtures for home and commercial installations, announces the publication of its new 1961 catalog. Illustrated and printed in full colors, the new catalog shows the complete Ruby line of authentic **oil lamp reproductions**. All the items are cast from exclusive molds, many of which date back to the Victorian era. These designs are being used by many decorators in modern homes, apartments, restaurants, hotels, etc.

Write No. B-1223 on coupon, pg. 45

A 20-page brochure, bulletin 760, describing the Kopp glass engineering and manufacturing service—step by step—from application analysis and formula development through mold design and custom-production, is available from **Kopp Glass, Inc.**, Swissvale, Pa. It includes full color photos of products used in street and highway traffic control; aviation, railroad, and marine signaling; street and interior lighting; dental and surgical lighting equipment; as well as industrial globes, indicator lenses, and color filters.

Write No. B-1224 on coupon, pg. 45

Two new catalogs on **lighting standard equipment** are available from the **Kerrigan Iron Works Co.**, 11th and Herman St., Nashville 2, Tenn. One catalog describes octagonal tapered steel and aluminum equipment and the other describes aluminum round tapered equipment. Included in the catalogs are new designs in both street and area lighting standard equipment with a good variety of arms to meet most any lighting problem.

Write No. B-1225 on coupon, pg. 45

Available from **Luminous Ceilings, Inc.**, 3701 North Ravenswood Ave., Chicago 13, Ill., is an illustrated, circular slide rule calculator of particular interest to specifiers of **luminous ceilings**. It quickly and accurately gives the description of a large variety of patterns in light diffusers available for luminous ceiling lighting systems. Rotary movement instantly supplies information such as panel sizes and average installation costs.

Write No. B-1226 on coupon, pg. 45

Installations

(Continued from page 40)

together, we had our 192-foot lengths.

Since the tables were casters, they were easily pushed around, bearing their fixture loads to each location easily.

The wooden horses, plus the casters, cost us about \$20 and saved many hours of costly labor. We've got them warehoused for future similar installations that may come our way.

Sales ideas

(Continued from page 36)

rather than having a free "come-when-you-can" arrangement, and (3) strict requirements which must be met in order to graduate as a residential lighting consultant.

The instructors feel that early results show it to be "a working program rather than a talking program."

Mr. Linebarger reports that dealers are stocking better quality fixtures and portable equipment, and are using structural lighting more effectively than before. These are, he says the basic needs of the lighting program.

It is felt that the best indications of the academy's acceptance and success are the many requests for reservations made for the next academy sessions. Only three meetings per week are scheduled instead of four, since the instructors will be revisiting former trainees, keeping lighting information current, and lending assistance on special problems.

In preparation for their new lighting assignments, both instructors attended an intensive instructors' course of the "Academy of Lighting Arts," in Cleveland, Ohio. In turn, the ladies who serve as home lighting consultants with the Arkansas Power and Light Company underwent a special two-week training course under the direction of Mr. Linebarger and Mr. Griffin. The ladies were hired specifically for their aptitude in the sales and public contact work.

Economic trends

(Continued from page 35)

three "up" blanks in his survey form, summed up the feeling of a healthy majority with the simple question: "Where else?" Not over two per cent of the respondents thought wage rates would be down in any of the three categories.

Personal consumption expenditures will climb to a new high in 1961, recession or no recession. This is the thinking of most of the economists. The median forecasts are that consumer expenditures at seasonally adjusted annual rates will edge up from \$330 billion this fall to \$332 billion in the first half of 1961 and reach \$336 billion in the second half. Nevertheless, the mild

downturn anticipated in GNP and industrial production is reflected to some extent in the forecasts of this series.

The 50 per cent range for the first half of next year extends downward to \$327 billion, slightly below the current rate, and upward to only \$335 billion. For the second half of 1961, the 50 per cent range runs from \$330 billion to \$342 billion with a fairly pronounced modal preference for \$340 billion.

On the question concerning interest rates, phrased in terms of the series on prime commercial paper, four to six months, there is a higher degree of unanimity than on any other question. An overwhelming majority of the economists look for relative stability in interest rates through 1961.

The median estimates for this December and next June are pegged at 3.2 per cent, with a slight rise to 3.4 per cent indicated for December 1961. Significantly, the 50 per cent range is very narrow for all three periods. By December 1961, it extends only from 3.0 per cent to 3.6 per cent.

Code rules

(Continued from page 43)

the same polarity with their required neutrals are *not* permitted to be run through a group of fixtures unless the fixtures are approved as raceways. Neither are two or more phase wires serving power loads without neutral conductors permitted to be run through, but this is seldom attempted or desired. See Figure 1.

Section 410-75 requires that capacitors, reactors, resistors, and similar auxiliary electric discharge lighting equipment be installed in accessible, permanently-mounted metal cabinets when such equipment is not integral with the fixtures. This auxiliary equipment should be as near as possible to the lamps to prevent long conductor runs between the equipment and the lamps.

An auto-transformer which is used as a part of a ballast for electric discharge lighting and which raises the potential to more than 300 volts is required by Section 410-76 to be supplied by a grounded system only.

Section 410-75(b) prohibits the installation of any portion of an electric discharge secondary circuit in more than one single display case

for cases not permanently installed.

Snap switches which are used to control inductive lighting loads, such as ballast or transformer type lighting loads, are required by Sections 410-77, 410-90, 600-2(b), and 380-14 (c) to have ampere ratings twice the ampere rating of the load unless approved for the purpose. A-c general-use snap switches are approved for controlling such inductive lighting loads on a-c circuits up to the full rating of the switch. A-c/d-c general-use snap switches are not so approved and should not be confused with the a-c general-use snap switch.

Wholesaling

(Continued from page 28)

"If I'd wanted it tomorrow, I'd have ordered it then" is the way many contractors feel about supply, and the Carpenters are trying to assure contractors that orders can be filled immediately.

In addition to domestic lines, C. & C. stocks such imported fixtures as spun crystal and hand-cut

brass from Germany, Japan, Australia, and other places. "We went all out for completeness," the Carpenters say. "We believe we can supply just about any fixture item."

As an indication of the success of this new service, there was a complete stock turnover twice in the first 45 days of operation; some 60 electrical contractors bought during that opening period.

The second phase of the venture is showing a great potential, and C. & C. is believed to be the first attempting it on a state-wide basis.

Sales trucks are being equipped with \$6,000 stocks of supplies and sent out on routes throughout the state. They have the material with them for immediate filling of orders. These warehouses on wheels are fitted out like parts wagons, and the driver-salesmen are contacting contractors and other clients in smaller towns. If a customer has an extra large order, the driver leaves what he has, then turns around and goes back for more. Routes are being set up for three trucks at present.

That the Carpenter family's new idea is filling a pressing need is further emphasized by the fact that the only advertising used was a letter to contractors about the opening. Salesmen didn't start work until three weeks after opening.

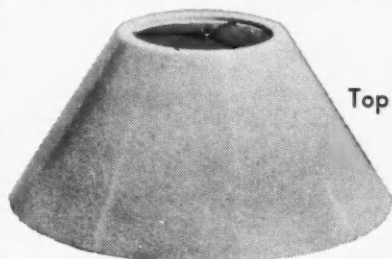
Go Kart track

(Continued from page 26)

color-corrected lamps, but a standard mercury lamp. The stands, however, had a generous amount of incandescent lamps placed throughout to give color balance for the spectator area.

Using 1000-watt high output mercury lamps, rated at 62,000 lumens, we were able to cut some of the costs of this installation, those of wiring capacity and fixtures. It was found that eleven 1000-watt mercury lamps were equivalent to thirty-one 1000-watt incandescent lamps and they required approximately 30 per cent less wiring capacity and poles. Also a considerably longer life was an added bonus to offset the additional cost of this fixture and lamp

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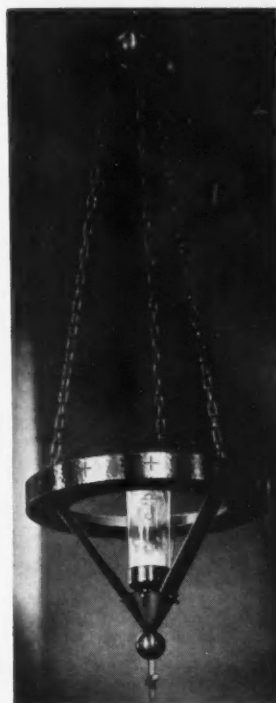
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over an incandescent installation.

Of the many fine fixtures of this type on the market today, the Wilson Wide-Lite was chosen to be used on this installation because of its very wide angle of distribution and good control. With its unique reflector it was found that direct viewing was not too blinding to the drivers. This condition was further improved by using minimum mounting heights of 24 feet.

The accessory hood mounted on the fixture was found not to improve the over-all efficiency very much, but did help to shield some point brightness from surrounding buildings outside the track. It was felt that this one consideration was worth the expense involved because of the residential neighborhood in which the track was built. This feature in the design of the lighting system offset to some extent the objectionable noise created by the operation of the track.

The mounting of these units had to be simple as well as strong since this area is occasionally subjected to winds of hurricane velocity. The poles were heavily guyed and mounted outside the fence line in order to prevent drivers from having collisions with them. They also serve as a convenient place for loudspeakers and pit lighting.

Only one fixture was mounted per pole. This was necessary because of the area to be covered and since the track might be changed from time to time. This gives flexibility to re-aim for proper coverage.

17 footcandles on track

The completed installation puts ten to 17 footcandles on the entire black top track. On the long curves, where speeds are reached up to 35 mph, the lighting level is sufficient to keep reflexes quick. The inner areas have the lowest footcandle levels, but sharp turns prevent excessive speeds. At the finish line, the fixtures throughout the grandstands spill considerable footcandles on the track, which enables viewers and judges to pick winners quickly and accurately.

The investment in this lighting system represents less than four per cent of the total cost of the track. While not the most elaborate installation, it does a creditable job. No serious accidents have occurred

since its opening, and no complaints of drivers being blinded have been recorded.

This customer has realized the satisfaction and economy of placing quality and good design above all else.

Photocells

(Continued from page 25)

lights, and pilot light safety control on furnaces (to shut off the gas).

Quite a few of the new homes being built today are utilizing these controls by mounting them in a box on the outside of the home and controlling front porch lights, post lanterns, and in many cases, several plugs in the interior of the home. The unit has a 3-way switch mounted near the bed in the master bedroom which permits the owner to turn off the current to the unit when going to bed. The other 3-way switch can be located wherever desired.

By having this system in the home, the owner is assured of lights being turned on while vacationing; or if they decide to go out before dark knowing they will be late returning, a flip of the switch will assure them of returning to a well lit home inside and out, instead of a dark one. This feature should be noted by electrical contractors who want to sell a customer "up" instead of "down."

All cities have apartment houses whose owners are good customers for the electrical contractor to sell this type of lighting control. The law requires all apartment houses to have hall lights burning during the entire night. So by selling the owners on the use of a photoconductive control, these lights will automatically come on at dusk and go off at dawn, without the managers having to bother with them or even set a time clock during the winter or summer months. Several of the newer apartment housing projects in Dallas, Texas, are now using this system.

In the case of highway billboards, the companies leasing these are forced to use astronomical time clocks or have a man reset clocks at certain intervals. Wherever the signs are burned all night these automatic switches will save the companies money, and give absolute control of the proper on and off time

of the signs. It has been proven by several electrical contractors that the units will pay for themselves.

Where the owners have time clocks, the unit can still be sold by using the existing time clock to control the switch by turning the switch on at about 3:00 p.m., and if they want it off at midnight, by turning it off at this time. The clock will turn on the unit early enough to let the photoconductive switch control the "on" time which is the important factor.

Dallas store application

The Normalee Stores, of Dallas, Texas, with a chain of 15 stores, are using these to control all of their store window lights. The loads range from 2 kw to 30 kw depending on the size of the windows. This was accomplished by the use of a magnetic relay which controlled the holding coils of all of the large magnetic switches, which in turn controlled the lights.

The photoconductive switch was installed on the roof or on the face of the building and connected to the holding coil of the small relay (a size 0 or 1). When the switch activated the holding coil of the control relay, it closed the coil circuits on the rest and turned on the lights. It is recommended that a 110 volt coil be used in the control relay, to eliminate any chance of a feedback to the photoconductive switch.

Filling station operators are another good prospect to sell as the use of this unit will cause their driveway area lighting to come on at any time that the outside light level drops below the number of footcandles for which the units are set.

A very economical "fail safe" control can be installed on central furnaces by simply putting a unit in a box where the pilot light flame will shine on the unit. The unit can be connected to a normally open gas valve in the line and if the pilot light goes out the unit will energize the gas valve and shut off the entire supply before any gas can escape to cause harm to the occupants. Most new systems have such a "fail safe" control, but many of the older systems do not, so here is another possible sale for the furnace company and the electrical contractor.

These are just a few of the many applications that with a little thought

can be turned into a profit maker for the electrical contractor, and a method of increasing kw consumption for the electrical utilities. It must be remembered that if the control is installed on a load that has been turned off at midnight, and is instead permitted to burn all night, the kw consumption will be doubled on that particular application.

Lifts production

(Continued from page 22)

trouble—a small human hair had fallen into the mechanism. Similar incidents have been virtually eliminated in "White Room" production, drastically reducing rejects of components and completed meters.

Delicate, sensitive meters with critical tolerances are produced by Hickok in its "White Room." Typical of the assembly work is the 250-degree meter which contains some 200 fine parts.

Producing meters for critical uses such as in aircraft, missiles, and space vehicles, Hickok has taken every precaution for quality production in its "White Room."

Not only are clean hands important, but clothes, instruments—everything—must be virtually dust-free and lint-free. A bit of lint or metal in the wrong place can cause a meter to register incorrectly.

Hickok workers thus wear special dust-free garments. Before entering the "White Room" they brush their clothing with magnetic brooms; they wipe their feet on two separate special magnetic floor mats. Inside, they work in an atmosphere that has dust removed electronically.

The room itself is pressurized at a constant level. With four psi higher room pressure than surrounding areas, dust is kept from entering windows and doors, temperature is held at a constant 75 F, and humidity is held constant at 45 per cent.

The luminous ceiling supplies 300 well-diffused footcandles to the modern, desk-like assembly line. The jewelers' eyepieces formerly required now need to be used only for final visual checks of the tiny assemblies.

Continuous rows of two-lamp eight-foot cool white high output

lamps are used behind the vinyl plastic ceiling. The area is approximately 30 by 50 feet with a 10-foot ceiling. The reflectances are 70 per cent for walls, 20 per cent at bench tops, and 10 per cent from floors.

Hickok's "White Room" has proved so successful that the company is putting into operation a similar 6,000 square foot facility at its plant in Greenwood, Miss.

Church lighting

(Continued from page 21)

Each of the main fixtures is supported by its individual winch, which is mounted on the ceiling joists above the ceiling. Through this arrangement each fixture can be easily lowered for any maintenance that might become necessary. The complement of lamps for each fixture includes three 150-watt R-40 reflector lamps for the up light, a total of six 60-watt lamps for the diffused center light and a 500-watt R-52 reflector lamp for down light. For the up light, 300-watt lamps can be used, and a 1000-watt lamp can be used for the down

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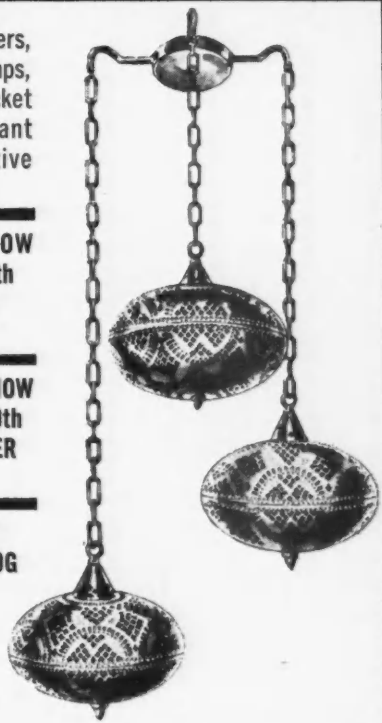
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light if this should become desirable in the future.

Specific lighting for the pulpit and the choir and chancel area in each case meets or exceeds the minimums set forth by the Illumination Engineering Society. The lighting for these other areas is furnished by two batteries of bullet-type louvered spotlights and floodlights.

The only deficient spot where the illumination level might be raised is at the altar. This will be changed. The lighting level for the pulpit, the choir and chancel area, and the altar is 40 footcandles. This level of lighting is being supplied through the use of 150-watt spots and floods. The system is arranged so that 300-watt lamps can be substituted thereby leaving open the possibility of doubling the illumination level if so desired. The fixtures are located behind the crossbeams over head and utilize the natural shielding offered by these crossbeams.

Another interesting observation that we could make is that our work was done separate from the architects and consulting engineers on this project. Yet the design of the

suggested fixture ties in most effectively with the panel and altar designs of the architects and consulting engineers, as can be seen in the pictures. The design theme was carried on throughout the area in the smaller fixtures placed in the hallways at the rear and in the balcony (Manning fixture CCI-306).

Guestroom

(Continued from page 17)

panels of light have a regressed housing, which gives the effect of floating in air. Corona's solid walnut frame is satin finished to complement furnishings. Red birch baffles cut a pleasing modular pattern across the face of the white styrene diffusers, adding a feeling of warmth and friendly informality. The Corona is a completely enclosed unit, engineered for simple maintenance.

Bathroom lighting is given a decorator's touch by the use of light sprays affixed through the mirror.

Luxtrol dimmer controls are provided on all lighting fixtures in the main room, terrace, and bathroom by the Superior Electric Co. Included in the room are eight WBD 200 units; one WBD 450; and one WBD 800.

The room was one of the featured attractions of the National Hotel Exposition held recently in New York's Coliseum. Sponsored by a group of top manufacturers of hotel-motel furnishings, the room is the third such annual exhibit to be presented. It is considered a synopsis of top design, and will also be shown in the annual Midwest International Hotel Show next spring.

Model home

(Continued from page 16)

Dozens of people played key and direct roles in presenting the 'Light for Living Home' in Oklahoma City. Edward Carpenter of Carpenter Electric Co., contractors, said he was very pleased his firm had been selected for the job that was carrying the lighting story to so many people. Mrs. Marguerite Borelli and Dale Hampton, designers of the lighting plan, spent long hours explaining to groups and individuals features and advantages and many possible variations of fixtures and effects.

Builders, designers, contractors,

decorators, suppliers, visitors — the consensus was that interest in what lighting can do for a home had been given strong new stimulus in Oklahoma City.

Oriental mood

(Continued from page 13)

flame. The bayonet type bulbs enclose two pieces of tungsten inside the clear glass in the shape of a candle flame.

The two pieces of metal are closely aligned to one another and the small voltage charging the metal inside the tube, which contains special gases, causes ionization and a rapid heating and cooling effect on the metal to produce the glowing flickering effect.

Stepping past the ship's wheel, visitors come into the exotic atmosphere of the Papeete Room, with an abundance of overhead lighting fixtures in a myriad of colors to give a south sea island effect.

Large glass globes, or floats, are suspended from the ceiling by netting. These were brought from the south seas and modified for use with colored incandescent bulbs. In the south sea islands, fish oil is poured into them, and burning wicks provide the illumination. Wicker baskets, many filled with artificial fruit, have strings of small colored lights within.

Mounted on the wall of the room



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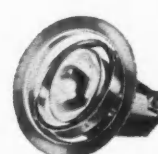
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are two huge salt water clam shells, surrounded by war clubs and other weapons from the islands. An incandescent yellow bulb behind the shells casts a soft glow, illuminating the wall and decorations.

Behind the curved bar in the Papeete room is a waterfall, with water cascading from a clam shell and on down a miniature rocky valley.

Black light causes a violet phosphorous glow from the specially treated water. Rock in the garden contains a mineral which also gives the fluorescent violet glow when exposed to black light.

Above the bar are four blowfish with lighting fixtures inside and small various colored 25-watt bulbs shining through their thin, translucent skin.

Stepping into the Singapore room the visitor is transported into the atmosphere of a British colony yacht club.

Antique nautical maps are recessed in wall coves and illuminated by two-foot 40-watt fluorescent tubes. Flicker flame bulbs are used inside kerosene type lanterns of the 1800's.

A soft yellow glow simulating sunlight shines through shutters covering one wall of the room. The effect is created by two dozen 25-watt yellow incandescent showcase lights, mounted on a multi-outlet strip 12 inches on center, behind the shutters.

Stepping into the Saigon room, the visitor steps into still another atmosphere. From the ceiling are mounted 40 small seven-watt star bulbs. These fixtures, as other overhead lighting throughout the res-

taurant, are wired in straight circuit, on No. 12 wire and protected by 20-ampere breakers.

Practically all of the lighting throughout is controlled by manually operated wall box dimmers, 28 of them altogether in the four rooms making up the dining areas, and ranging from 800 to 1800-watts. A 100-ampere three-phase, four-wire panel box takes care of the wiring for all four dining areas.

A temple front, complete with temple carvings and idols, is within the Saigon room. This also provides a small elevated dining area. Contemporary crystal chandeliers with 60-watt bulbs are used here.

Indirect incandescent showcase lights are recessed in coves behind booths by the walls to illuminate porcelain and wood carved temple gods mounted on the walls.

In the restaurant's Macao room are found treasures from Kwantung temples and other sources around the south coast of China. Entering the room, the visitor sees a carved idol accented from behind by a small flood light, which illuminates the surrounding wall.

This is the Bodhisatta love goddess, Kwan Yin, dating back to the Ming dynasty. Beside the idol are two Fu dogs of burnished bronze. The Fu dogs, as with other major decorations, are highlighted by small adjustable pin-hole spot lights recessed in the ceiling.

Focal point of the lighting decorations are the large six-sided lanterns suspended overhead. The lanterns are the same as used in China, but fitted with standard lighting fixtures.

The lighting arrangements for the

Dallas Ports O' Call was a new challenge for Crane Associates. Although there are a number of other restaurants for which they did the designing and decorating, this is the first to have four separate rooms, each of an entirely different decorative scheme.

Mr. Crane himself did much of the original planning and designing of the interior. George Nakashima, chief of the architectural design section for the Crane organization, carried out many of Mr. Crane's ideas and contributed many ideas of his own along with Florian Gabriel, chief decorator for the firm.

Louis Baronello, vice-president of Stephen Crane Associates and executive director of management, is in charge of the Dallas operation, as well as other Stephen Crane restaurants throughout the country.

The Vanguard Corp., Dallas, was general contractor for the work, subcontracting the electrical installations to Fischbach and Moore. Gregerson and Gaynor, Dallas, were called in as electrical and mechanical engineering consultants for the job.

Smithsonian

(Continued from page 11)

hammers to be indispensable tools. A power drive requiring only two men to pull the 500 MCM cable was an incalculable labor and time-saver.

To protect exhibits and visitors to the museum during the progress of our job, we enclosed the balcony with an extension around the hand-rail as a safety measure against falling materials.

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LIGHTING'S CLASSIFIED ADS ARE ON PAGE 66

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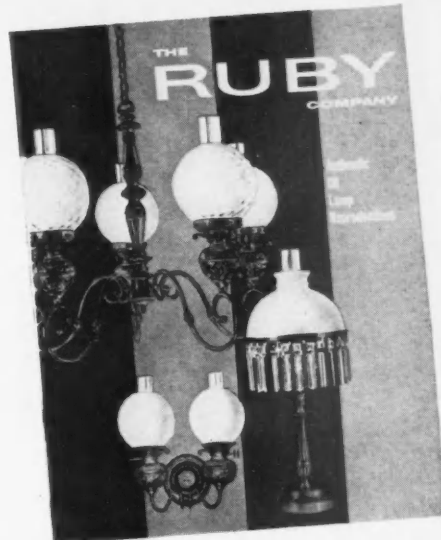
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ADVERTISER'S INDEX

A	
Acme Lite Products	37
Alexander Tagg Industries, Inc.	62
Angelo Bros. Co.	51
Artolier Corporation	5
B	
Berger Machine Co.	27
C	
Central Porcelain Co.	52
Chilo Mfg. Co.	63
Clarolite, Inc.	30
Congress of Motor Hotels	62
D	
Delval Mfg. Co.	2
DeRamus Sales Co.	30
Dini Company, Frank	49
E	
EJS Corporation	7
Elite Glass Co., Inc.	61
Executive Inn Motor Hotels Corp.	57
F	
Feldman Bros. Brass Co.	67
G	
General Electric Company, Apparatus Sales Div.	18, 19
Geringer & Son Mfg. Co.	43
Glass Laboratories, Inc.	51
Globe Lighting Products, Inc.	1
J	
Jay Lighting Mfg. Co.	35
K	
Kukla Electric Company	45
L	
Leviton Mfg. Co.	Third Cover
Lightcraft of California	31
Llemsa	52
M	
Marplex Company	59
Meierjohan-Wengler Co.	59
Monsanto Chemical	68
N	
Nord-New York, Inc.	8
North American Electric Lamp	67
P	
Phoenix Lighting Fixture Mfg. Co.	47
Progress Mfg. Co.	Back Cover
Puritan (Marval) Lighting	41
R	
Robertson Transformer Co.	33
Rohm & Haas Co.	23
Rotuba Extruders, Inc.	29
Ruby Company	67
S	
Sarna, Inc., S. S.	61
Sheffield Plastics, Inc.	38, 39
Sheldon Metal Products	30
Sterling Industries, Inc.	55
Sunbeam Lightingwares, Inc.	56
T	
Thatcher Glass Co.	27
V	
Virden Co., John C.	Second Cover
W	
Ward Engineering, Inc.	9, 61



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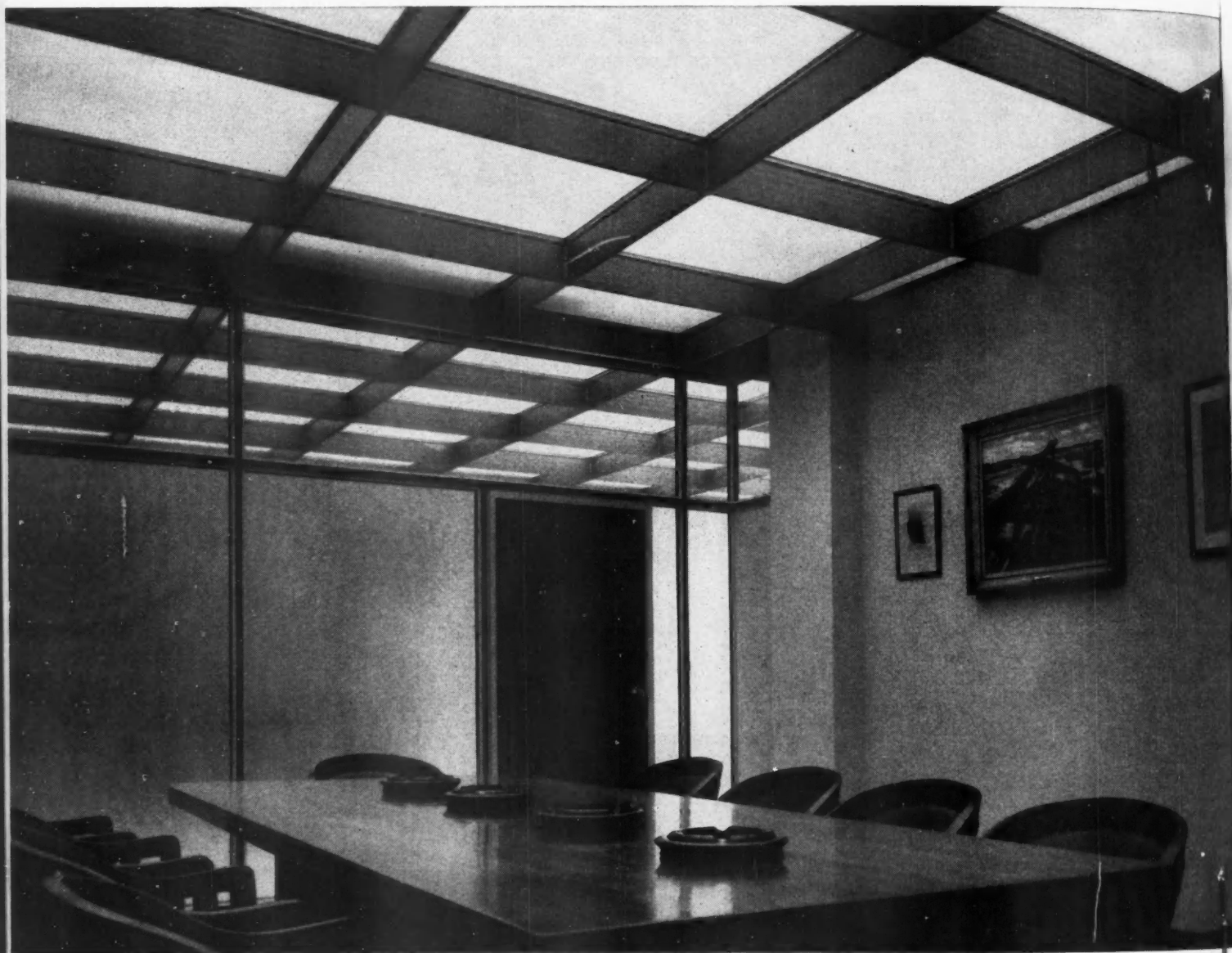
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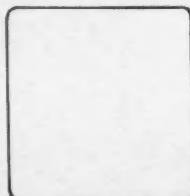
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
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